33rd YEAR

CHEMICAL WEEKLY

VOL. XXXIII OCTOBER 6, 1987 NO. 4

I.C.P.T.

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13 NOV. 87
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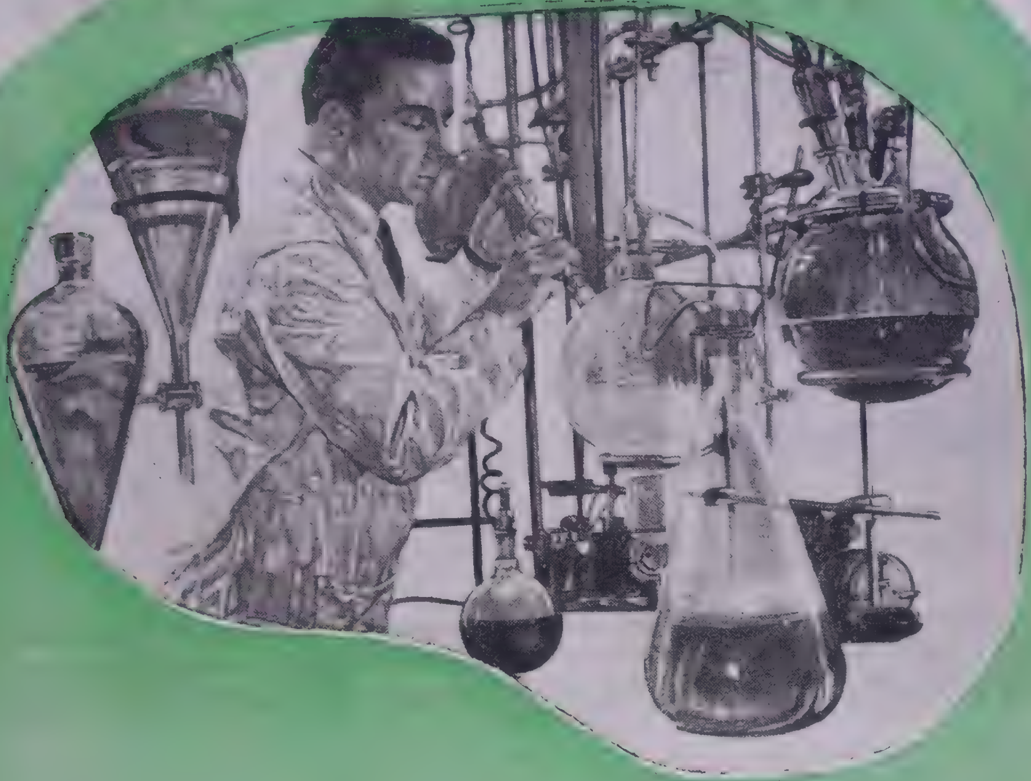

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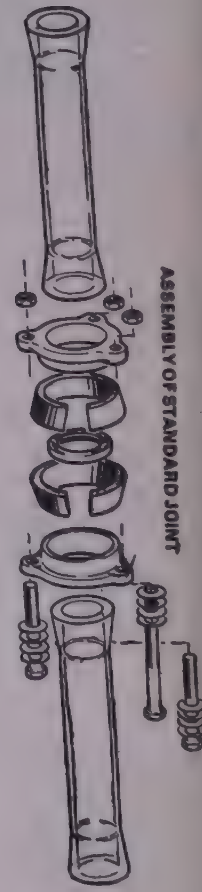

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MANGALYA 8/87

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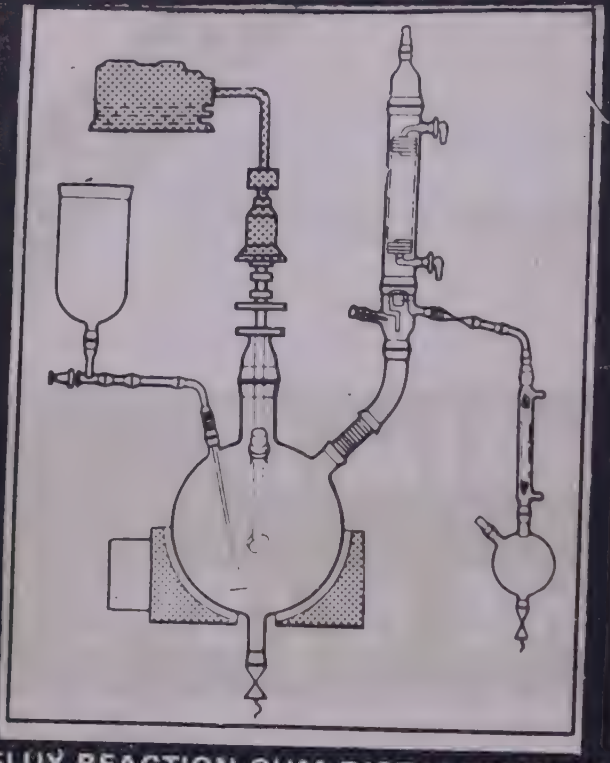

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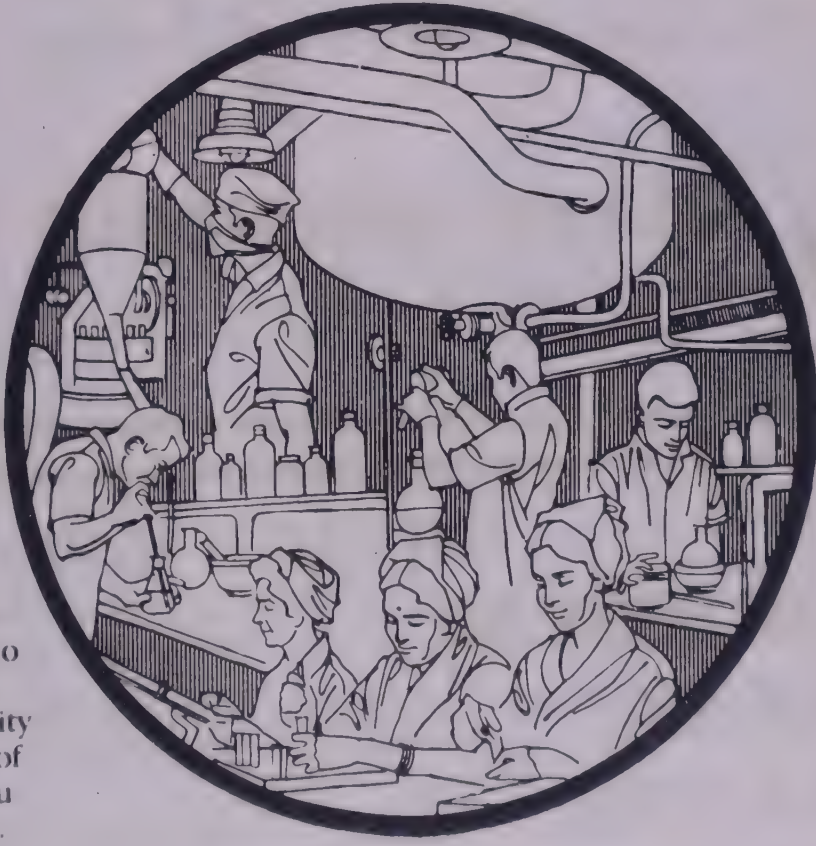

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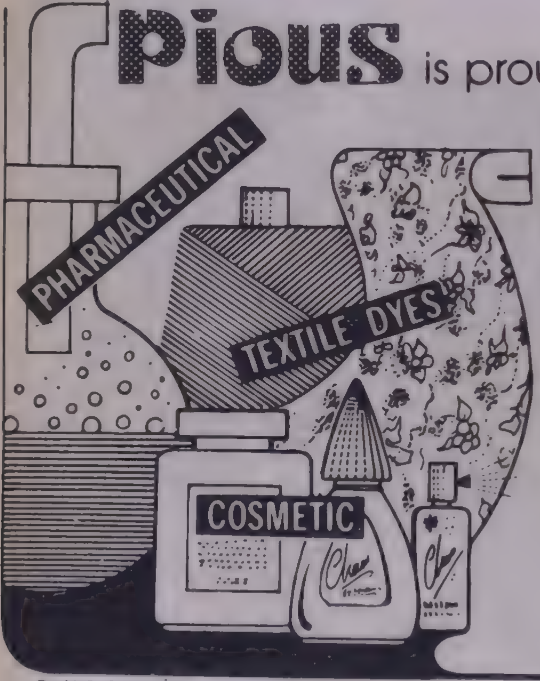

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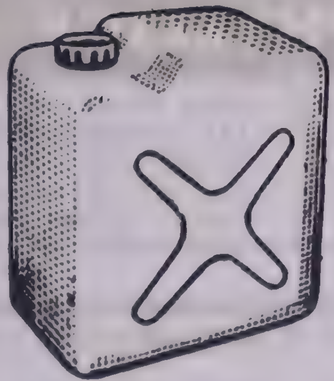

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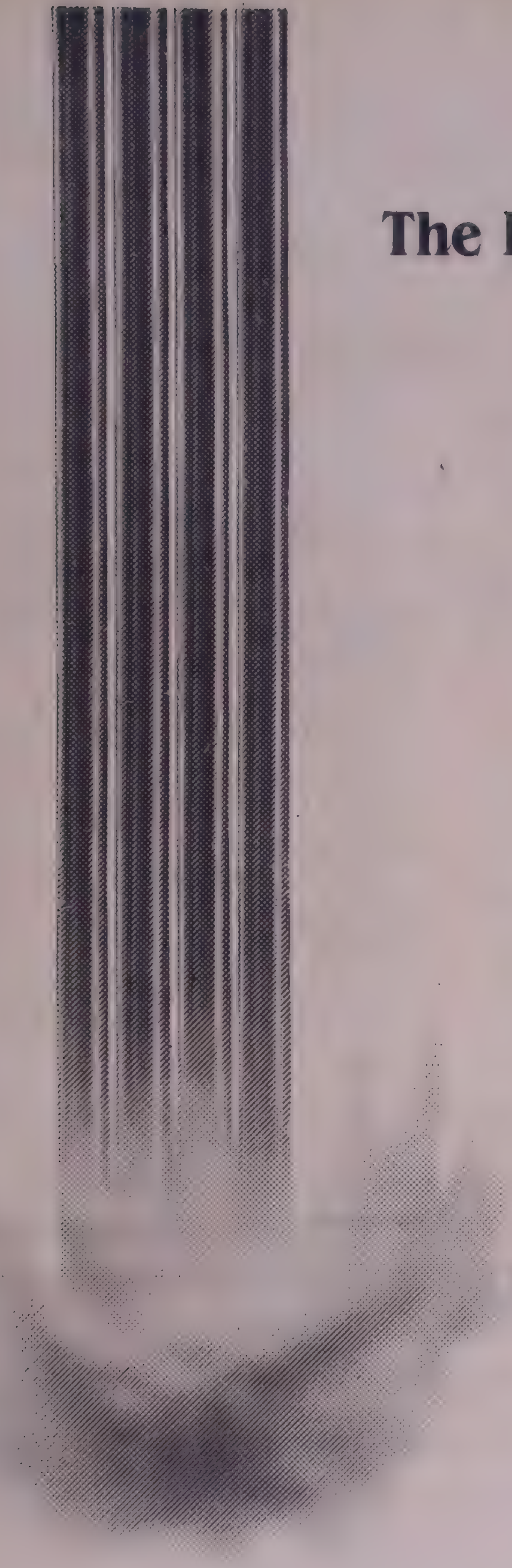

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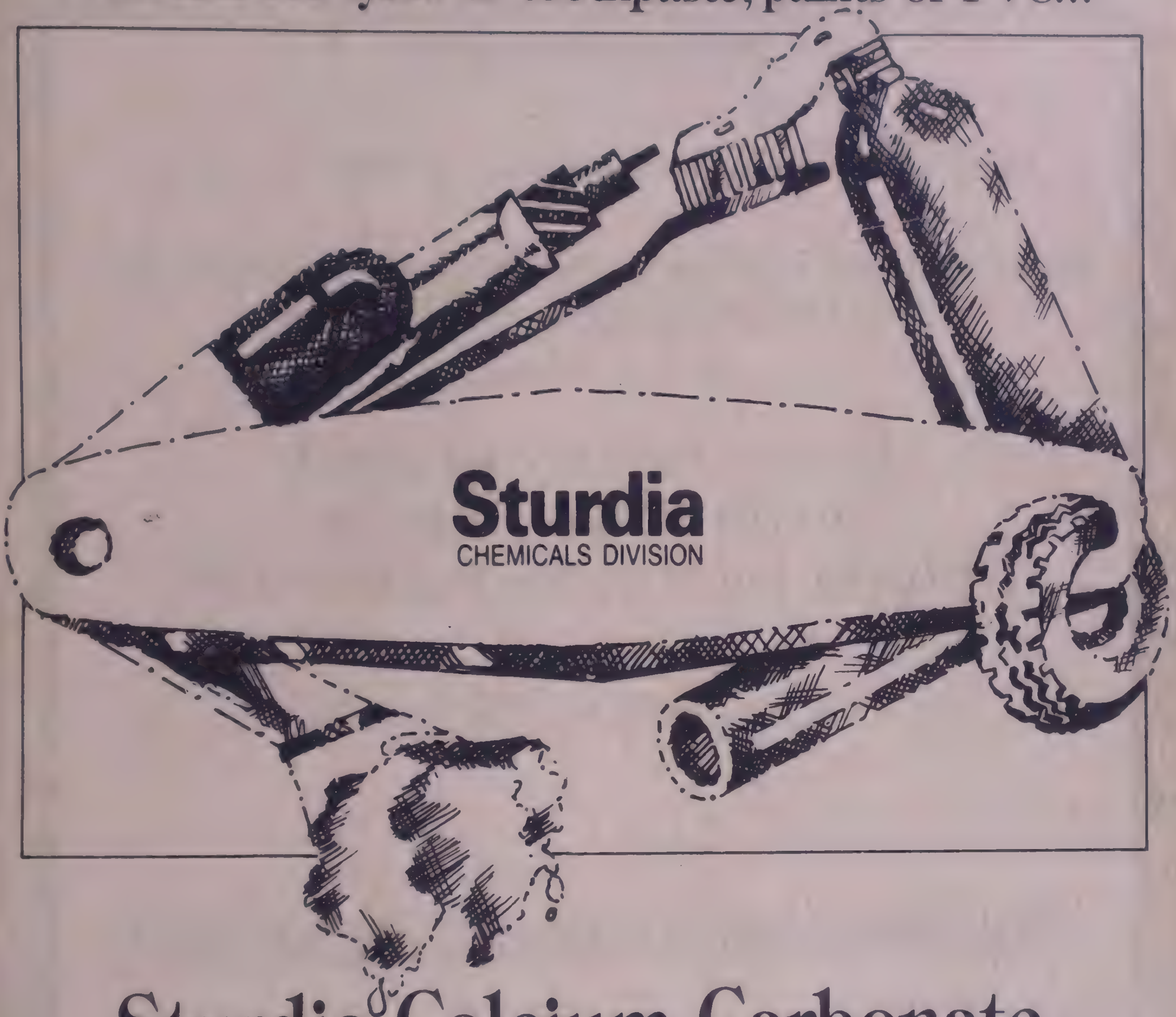

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CHEMICAL
WEEKLY

VOL. XXXIII OCTOBER 6, 1987 NO. 4

Crucial Role of Rare Earth and Rare Metals

What do miniature headphones, supercomputers, and igh-speed trains have in common? They are all made possible by the use of rare metals, the 79 hard-to-obtain ores found throughout modern industry. Cobalt for head-phones and heat-resistant alloys, gallium arsenide or optic fiber and semiconductors, tungsten for steel ails, chromium and platinum for automobiles . . . the ist of strategic minerals expands each year, as industries search for new metals with superior energy saving or functional efficiency. For example, while plentiful silcon has long been the basic building block for semiconductors, scientists have found that gallium arsenide s more durable at high speeds and temperatures, and electrons can travel six to seven times faster through gallium than through silicon. Given these attractions, analysts predict that the market for rare metals will be 75 times current levels by the year 2000. Demand for gallium, in particular, should grow 100 fold.

Rare metals earn this label by being found in concentrations of less than 1000 parts per million wherever hey are mined. They are often difficult to extract with ust a few supply sources. Many are found in politically nstable countries, making steady supplies of rare metals one of the 1980's most critical issues, just as ecuring a steady flow of crude oil was among the top oncerns of the 1970's. But unlike petroleum, most rare metals have no substitutes for industrial application. If upplies are stemmed by civil unrest or political decree n the source countries, the results for Western economies could be traumatic: It is estimated that a year long utoff of chrome supplies, for example would send apan's GNP plunging by at least 5%.

Of course, a stockpile of strategic rare metals is a high priority for most industrialized states, but few are satisfied with current reserves. The US began stockpiling metals during World War II, and currently boasts a three year supply of up to 93 materials vital to defence and industry. Although it is the world's second largest consumer of rare metals. Japan only began amassing the ores in 1983, and is still far from its goal of a 60 day supply of seven metals: nickel, chrome, tungsten, cobalt, molybdenum, manganese, and vanadium.

Acquiring and maintaining stockpiles is one strategy to take, but it's expensive (Japan spends some $18 million a year), and hardly a long-term solution to the problem of scarcity. Other efforts currently being made by both Government and the private sector include developing new natural supply sources and new processes which can recover the metals closer to home. Extensive geological surveying in Japan has identified minor deposits of such metals as gallium and tungsten, reducing reliance on outside sources.

Superconductivity has quite suddenly leap frogged to a Tc of about 100°K in some newly synthesised ceramic materials. One of their major constituents is yttrium or some other rare earth element. The semiconductor is supposed to have brought about the second industrial revolution. The new superconductors may as well usher in the third.

The rare earth elements till now languishing in the backyard of chemical industry have, therefore, shot up into prominence. They are, side by side, finding new and increasing applications in the field of high technology.

An ardent mineralogist was Kari Arrhenium, a lieutenant in the Swedish Army. While spending his holiday in the village of Ytterby he unearthed a heavy black stone in an abandoned guarry. He named the mineral Ytterbite. A few years later (1794) Prof. Gadolin, a Finnish chemist, found, that ytterbite along with oxides of iron, calcium and silicon contained large amounts of an unknown substance, most probably a new element or a new earth. This yttrium earth from the village of Ytterby was later found to contain two other new elements named terbium (using the three middle letters) and erbium (using middle and last letters).

A similar earth - cerium earth - discovered in 1803 proved to be the source of another set of new elements anthanum (the hidden one), samarium, europium etc. In all, the existence of 17 such elements called the rare earths having very similar chemical properties was firmly established.

The tribute rare, has however, turned out to be a misnomer. Some of these rare earths are much more abundant than the commonly known elements of every day use. For example, yttrium is more abundant than lead, mercury, cobalt or silver. The epithet rare was significant only in the sense that these elements till now were rarely used in industry. This situation is also changing very rapidly.

The advent of ion exchange resins has enormously simplified the separation procedures. The mixture of rare earth is placed on the top of an ion exchange column and worked with an agent like ammonium citrate or EDTA. The small difference in size of these ions leads to differential affinity between the resin and the agent, and the individual rare earths which travel down the column at different speeds, leading to a clean separation. The metals can then be obtained by electrolysis of their fused chlorides.

The rare earths have numerous and diverse applications in modern technology. They can be used as mixtures or as individual elements of high purity (greater than 90%). As mixtures they are used as catalysts in petroleum refining and for polishing mirrors and lenses. As mish-metal (an alloy of cerium with other rare earth metls) it is used in the steel industry. These metals having a high affinity for non-metals like oxygen, nitrogen and sulphur help in removing their inclusion and improve the qualities of steel. Flints used in cigarette lighters for producing sparks by friction are made from an alloy of 75% misch-metal and 25% iron.

Individual rare earths have been used with great success and enormous profit in such diverse areas as the manufacture of permanent magnets, lasters, artificial jewellery, colour television screens and now new superconducting ceramics. The samarium-cobalt magnets are being replaced by neodymium iron magnets having a magnetic energy of 300 Kj/cubic meter. Yttrium-aluminium garnets are used as artificial diamonds. The resemblance is so close that only an experienced expert can distinguish between the artifical and the genuine. Neodymium incorporated into a YAG host makes a standard solid state laster used in surgery. The colour TV picture tube is coated with a large number 300000) tiny phosphor dots. When irradiated with a stream of electrons these phosphors convert their energy to emit light or specific colour. Europium, terrium, yttrium etc. form an important component of these phosphors. This requirement, small at present (5 tonnes of yttrium can make one million tubes) is bound to built up in response to increasing use of colour TV and computer display screens.

Rare earths can either be mined in locales ranging from Australia and India to the US and the Soviet Union, or they can be recovered from uranium and phosphor ores.

The list of both rare and base metals (the latter are found in higher concentrations) now used in high technology industries sounds vaguely reminescent of ar outer space adventure epic: molebdenum, tantalum phosphor, and titanium for instance. In fact, many o them are found in space, since titanium and other alloys help make satellites and space shuttles lightweight bu strong. These metals, along with novel composites suc as fine ceramics, are knwn as new materials, and a nev section of the metals group, the New Materials Depart ment, has been established to coordinate their trade

Estimates have it that high tech demand for nev materials by the year 2000 will be 15 times curren levels. A glance at some of the most promising industrial applications makes it easy to understand the tremendous growth. One example is the new 3 x 6 optica switch, used for switching light paths. This switch operates by directing light through a wave guide on top c a layer of crystal niobic acid lithium. Voltage applied t electrodes changes the refractive index and allows opt cal switching through the wage guide. Switching of mor than one gigabit of optical data can be done in less tha one nanosecond.

-- T.P.S. RAJA

CHEMARENA

S.L.VENKITESWARAN

World energy issues in 1990s

"US oil production peaked in 1970 and has been essentially constant since 1976 at about 2.97 billion barrels a year even though reserves dropped by about 0.63 billion barrels a year and stood at only 28.4 billion barrels" -- roughly ten years' stock. The new discoveries are very little while a good part will be from increased expectations of recovery from existing fields through Enhanced Oil Recovery. Hence conservation is unavoidable.

The ultimate conservation is the absence of supplies at any cost. There is the high cost of "price driven" conservation. But what will be the result of supply-demand disequilibrium which will soon prevail not only in USA but world-wide. Low prices for oil in the recent past has helped in the short-term but has worsened the problems for the long-term. A strategy to counter the future trends in prices and shortages is essential.

Coal is an alternative for USA and the new processes of transport by slurry pipe lines, used in fluidised bed combustion, through gasification and combined cycle systems open up new vistas for coal-based energy systems. Gas is better-than-oil if locally available but transport is costly. Nuclear power is bound to grow in spite of problems but the fusion process is not expected for decades. Other alternatives -- solar, wind, tides, biomass as such -- are not yet likely to prove sizeable enough. Synthetic fuels originating from coal or biomass are a matter of convenience but such liquid fuels are costly and in any case can be only of short-term duration.

The world energy situation in the Nineties will be nearly as uncertain and turbulant as the Seventies and even more so in the early Twenties. Secure and adequate supplies of energy at reasonable prices are the sine-qua-non of present life-styles and decisions require to be taken today for ensuring supplies after ten years.

These decisions are all the more vital for a developing country like India where energy usage rises much faster than in the advanced countries. India has meagre resources to bank upon but areas of some promise in oil and gas in some off-shore areas. The coal supplies, may cover less than the century's needs even at current levels and are in small selected areas from where transport to the far corners will consume a significant portion of it. A plan to tap agro-based renewable fuels for meeting even a small part of India's energy requirements from the beginning of AD2000 should take shape from now onwards. This has also to be closely linked to the use of hydrocarbons or alcohols as feedstocks for chemical industries for an overall conservation of resources.

Drugs for AIDS

No other disease has created so mch scare in recent times as AIDS -- Acquired Immune Deficiency Syndrome -- which began to be noticed only five years back. For a society which as triumphed over most infectious diseases and totally eliminated the once dreaded small pox, AIDS which is caused by a virus and transmitted only through blood or body fluids associated with sex, has struck with a vengeance. Although it is transmitted mainly among homosexuals or through transfusion of blood from those who harbour the virus responsible for AIDS, it is an indirect killer because of its invasion of the body's natural antibody defence system. The virus described as Human Immuno Deficiency Virus (HIV) and the effect is the onset of diseases like pneumonia on a weakened system leading often to death. The concerted efforts of scientists and doctors have enabled the identity of HIV virus to be established and methods of detection or diagnosis. The virus can remain dormant or inactive in many and suddenly start on their mad race against the body's antibodies. Homosexual activity could be curtailed and in these days of extensive blood transfusion, tests of the blood of donors are essential. It has been possible to develop diagnostic agents for detection of HIV Antigens and many firms have come up with the needed reagents. These are termed ELISA -- Enzyme Linked Immunosorbent Assays -- and millions of blood samples are now regularly tested at a cost of millions of dollars.

Beyond the primary task of identification and screening to prevent spread of AIDS, comes the question of effective medicines for cure or control. This is all the more difficult in view of the very limited success over viruses by the type of drugs so effective over bacteria. There are no metabolic pathways or enzymes to be countered and therefore ways of fooling the viru's mode of reproduction through compounds very closely similar to the amino acids or nucleic acids are being tried. The first such chemical AZT -- azidothymidine -- under the name of Retrovin by Burroughs Wellcome has received approval as IND -- Investigational New Drug. AZT is said to be mde in a series of complex reactions and is very costly, $8,000 to $10,000 for a year's supply for one patient. Some 30,000 patients are expected to be covered by this year-end and results analysed for getting the final approvals of AZT as a commercial drug for AIDS. Many other drugs are under stages of development and may soon get approvals as IND to proceed next with detailed appraisals. Some of these drugs are getting ready outside USA.

More important are some developments towards an effective vaccine. A synthetic protein fragment identical to a part of the virus is said to promote the elaboration of an effective vaccine but there is a long way to go to reach an estimated $350 million market. A list of drugs and vaccines under investigations was given in *CHEMICAL WEEKLY* of 21.7.1987.

The latest is that a vaccine from a purified envelope protein of HIV virus is to be tried out on 81 healthy volunteers, all homosexuals and of the high risk groups. The vaccine's safety and ability to produce immunoresponse will be evaluated over several months by the National Institute of Allergy and Infectious Diseases.

But recently the claims of a peptide as a new drug to tackle AIDS has created some doubts and controversy. Dr. Bert and co-workers of NIMH claim that this Peptide-T can block the AIDS virus from infecting human cells. The Peptide-T has eight amino acids and is said to occupy the same receptor site on the cell membrane that AIDS uses. The virus has molecules of a glycoprotein IP 120 which is said to be the key for a "lock" --CD_4 receptor site on the cell membrane of T_4 lymphocytes. A particular 5 amino acid sequence of IP 120 is said to be vital and a peptide has been synthesized to match this. But other workers claim to have met with no success. Even if anti-viral effect is proved for drugs toxicity is a greater problem. It is a long way before any useful drugs or vaccines can emerge to capture a multi-million dollar market. US has had over 21,000 deaths as a consequence of AIDS and many thousands may succumb to this AIDS scourge in the years ahead.

Blood Substitutes

The recent apprehensions about AIDS infection through blood transfer seem to have given a boost to blood substitutes. Earlier perfluocarbons were developed as a safe blood substitute which can fulfil the essential function of oxygen earlier.

"Flurisol" was marketed by Alpha Therapeutics but did not fulfil the promise. A new type of substitutes which contain polymerised haemoglobin as the oxygen carrier has been developed by Northfield Laboratories and this product needs no cross check on blood type -- matching and hence more universally applicable. It has also longer shelf life and is free of viruses. But haemoglobin substitutes and modification rely on blood as raw material --bovine blood haemoglobin. Later a recombinant derived haemoglobin is possible.

A major market for the new blood substitutes or oxygen carrier fluids is in maintenance of organs outside the body until they are used for transplant. Also for use in cases of acute anaemia, trauma and in military casualities. The price is high at $225 per unit, one and half times of "donor" blood. The US market is estimated at $10 billion and many new producers have got into the market with the haemoglobin-based products. (*Chem Week* 5/8/87).

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Alcohol price being raised

The price of alcohol is being substantially raised from Rs. 1.07 per litre to Rs. 2.30 (inclusive of excise) with effect from October 1.

The alcohol price increase is being effected following a review undertaken by the Department of Chemicals and Petrochemicals. It was based on the report submitted by the Bureau of Industrial Costs and Prices.

The alcohol price revision follows the announcement of a new molasses and alcohol prices and distribution policy to be implemented from October 1. Under this policy, prices of molasses have been revised, thereby necessitating a corresponding increase in the alcohol prices.

Official sources point out that the recommendation of BICP was for an increase in the alcohol price to Rs. 1.97 per litre. Its recommendation was based on the increases in the cost of production of the distilleries and the rise in the price of molasses.

However, the Government has decided to incorporate some additional costs in the final price of alcohol. One of the arguments in favour of raising the alcohol price is that the open market price is higher than even the revised prices.

The alcohol users are paying this price to the manufacturers because of the prevailing shortages in some States, even though the Government-stipulated price is much below.

It is therefore felt that by raising the officially fixed price to Rs. 2.30 per litre, the Government is ensuring that the increased realisations go to the distillers instead of some middlemen traders. Official sources also discount fears that the rise would upset the costs of production of those industries using alcohol as a raw material. This is because even now these industries are paying a similar price, although such payments are not made in the open market.

Moreover, the impact of the increase in alcohol prices on industrial users would be partly offset by the full excise rebate allowed to them under the revised policy. The earlier policy stipulated that all users of alcohol, either for industrial or potable purpose, would have to pay the full excise.

But the new policy has raised the Central excise duty on molasses from Rs. 30 to Rs. 60 per tonne. But the excise duty would be fully waived for such molasses that are used for producing alcohol for industrial use.

This naturally will reduce the impact of the price hike of alcohol for industrial users.

The price of alcohol had to be raised as besides the excise hike, the price of molasses, the main raw material, was increased from Rs. 60 per tonne to Rs. 120 per tonne. The new policy had similary effected a 100 per cent rise in khandsari molasses from Rs. 90 per tonne to Rs. 180.

At the time of announcing the revised policy, the Union Minister of State for Chemicals and Petrochemicals, Mr. R. K. Jaichandra Singh, had said the impact of revised molasses price on alcohol prices would be about 13 paise per litre for industrial purposes and about 41 paise for potable use. Apparently, the price that is going to be announced now includes other cost escalations as well.

The total availability of alcohol in the country during 1986-87 (November-October) is estimated at 6,900 lakh litres. According to estimates, this quantity should be enough to meet the domestic demand. However, shortages of alcohol in some States have been reported in the last few months.

Such shortages are only regional and the total availability of alcohol is considered by the Government adequate. Shortages have been reported as some States like Uttar Pradesh had raised the levies on sales to other States by stiff margins. This curbed movement of alcohol from surplus areas.

The Government is alive to this situation, official sources say. Imports are also being considered by the Department of Chemicals and Petrochemicals. India had imported alcohol in 1985-86 season also to meet such a situation of regional shortage.

PANEL ON PRODUCTION OF NCN — MOLASSES ALCOHOL

The Government has set up an 8-member inter-ministerial panel to draw guidelines for production of potable alcohol from raw materials other than molasses.

It will also lay down rules for consideration of applications for grant of letters of intent or industrial licences for the manufacture of potable alcohol from non-molasses sources.

The Committee with Mr. H. K. Khan, Secretary, Chemicals and Petrochemicals, as Chairman, will look into the supply of various alternative materials as tapioca, mahua flower, beetroot, spoiled wheat, spoiled rice, spoiled fruits and potato for the manufacture of alcohol, which may not be otherwise usable.

It will determine the modalities for assessing quantities in each State which could be assumed as surplus for being allowed to be used for the manufacture of alcohol.

The Committee, which is to submit its report in one month, will look into the capacities to be allowed for the manufacture of alcohol from each raw material without detriment to the interest of other uses of these raw materials.

The creation of additional capacity or expansion of existing capacity for the manufacture of alcoholic drinks was banned from November 1975 till the revised policy on molasses and alcohol, relaxed the ban on creation of further capacity for production of potable alcohol from non-molasses based raw materials, without bringing such alcohol under price control.

Other members of the committee are, Mr. Shyamal Ghosh, Joint Secretary, Department of Chemicals and Petrochemicals, Mr. K. J. Reddy, Joint Secretary, Department of Industrial Development, Mr. N. Biswas, Deputy Director General, Directorate General of Technical Development, Mr. V. Lakshmi Rattan, Joint Secretary, Department of Food, Dr. T. V. Sampath, Agriculture Commissioner, Department of Agriculture and Cooperation, Dr. P. V. Krishna, Adviser, Department of Chemicals and Petrochemicals, Mr M. S. Murthy, Adviser, Department of Chemicals and Petrochemicals and Mr. L. K. Malhotra, Director, Department of Chemicals and Petrochemicals (Member-Secretary).

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DRUG PRICE CONTROL ORDER :

New trade margins may be revised

The new trade margins fixed in the drug price control order, 1987 may be refixed, it is learnt. The government is appointing a special committee to review and refix the trade margins to chemists and wholesalers shortly.

The newly fixed margins for the trade in the DPCO, 1987 is termed as unworkable by the drug industry. According to informed sources, the committee will consist of representatives from the government, industry and trade.

The implementation of the new DPCO could be taken up only after the refixation of the trade margins based on the recommendation of this committee. The government is also expected to issue a few clarifications on the new DPCO in a day or two.

The work of price fixation of individual bulk drugs on the basis of guidelines in the new DPCO is expected to start only thereafter.

The souces say that fixation to disproportionately lower rate or margin for wholesalers in the new DPCO in comparison with retailers' margin is the main point of contention.

The government has revised the wholesalers' margin to 3 per cent only now from 2 per cent earlier. As against this, the retail trade margin has been raised to 17 per cent from 12 per cent in the case of ethical products and to 15 per cent from 10 per cent in the case of non-ethical products.

The sources point out that although the government had fixed the margin only at 2 per cent for wholesalers in the old DPCO, most of the drug units were actually paying about 6 per cent or more. Now with a statutory obligation of 15 per cent and 17 per cent as retail margin in the new DPCO, the drug units may not be able to offer a margin of 6 per cent to wholesalers, the sources say.

In that event, the drug companies have to stick to the officially fixed margin of 3 per cent only to the wholesalers. This would mean a straight 50 per cent reduction of the currently paid wholesalers' margin.

The sources say that wholesaler or dealer would undertake marketing of drugs at a margin of 3 per cent now. In fact the wholesalers were expecting an increase of trade margin with the new DPCO.

They point out that there has been a substantial increase in the cost of distribution, promotional expenditure, etc. in the last eight years with no corresponding increase in margin or other benefits from the drug companies.

Meanwhile industry sources in Bombay say that the steep hike in the retail trade margins would take away a major part of the profits the drug companies might get by way of increased mark up in the new DPCO.

TNCMA: SEVENTH ANNUAL CONFERENCE

The Tamil Nadu Chemical Manufacturers' Association held its seventh annual conference in Madras on September 24, 1987. Mr. N. Venkateswaran, Treasurer, who presented the annual report of the association highlighted its achievements over the past year. He noted the leading role played by the association in bringing imported methanol to Madras port. In the period of December 1986 to July 1987, the State Trading Corporation had brought in 4,500 tonnes of methanol directly to Madras. This proved to be an enormous advantage to consumers in South India who were earlier obtaining their shipments via Bombay or Kandla ports.

The Associations efforts were also instrumental in solving the problems of the alcohol and alcohol-based industries. Apart from getting the State Government to lower the excise duty on export of alcohol from Rs. 5 per litre to Rs. 0.50 per litre, the association also took an active part in seeing that the control on molasses is retained, as decontrol would disrupt the economy of the distilleries and the alcohol based chemical units.

Plans of the association include the setting up of a trust of sort out problems of the industry, and to help in directing R & D efforts in the state. The trust is expected to be self supportive in finance. The association is also planning to hold a seminar at Salem to focus on the Growth of the Chemical Industry in Salem District.

Keeping in view the national status that the association now has, with members from outside the state of Tamil Nadu, the association has decided to change its name to the 'Chemical Industries Association; following the pattern laid down by similar associations in London and Stockholm.

Speaking at the function the Industries secretary Mr. P. Shankar, urged the industry to look deeply at the problem of energy conservation. The problem, he said, assumed special significance in an energy deficient state such as Tamil Nadu.

The Hon'ble Minister for Tamil Nadu, Mr. Ponnaiah who was the chief guest at the function also emphasised the power and water shortages in the state. The problem was serious enough to drive away mega projects which were on the anvil. The Minister also urged the members of the association to look into the agro-based chemical industries as Tamil Nadu had a rich agricultural base, which, if properly exploited could yield numerous value added products. The Minister also ruled out the possibility of any export of molasses out of the state, as it was a vital raw material to a whole series of industries.

At the conclusion of the meeting, the President of the Association, Mr. S. Krishnaswamy proposed a vote of thanks.

TNCMA : OFFICE — BEARERS FOR 1987-88

TN Chemical Manufacturers' Association's Office Bearers' Election for 1987-88 : Mr. S. Krishnaswamy as President, Mr. M. A. Ramaswamy, Dr. D. M. Mohunta and Mr. S. V. Ravi as Vice-Presidents, Mr. P. K. N. Panicker and Mr. T. L. Viswanathan as Secretaries and Mr. N. Venkateswaran as

Bullets for health

Modern Drug Production Gives Hope to Millions

Small white tablets are the ammunition helping to defeat one of India's killer diseases. With a resurgence of malaria throughout the subcontinent in recent years, new pharmaceutical facilities have been developed here to answer the threat with increased production of much-needed anti-malaria medicine.

In pre-independence India malaria was known as "Public health enemy number one," responsible for an estimated 800,000 deaths annually. After the National Malaria Eradication Programme was launched, in 1958, the incidence of malarial infection dropped to just below 100,000 cases in less than ten years. But by 1976 the trend had dramatically reversed with some 6.4 million persons reported to have the mosquito-borne afflication.

While trying to control malaria by attacking mosquitoes directly with insecticide, the Programme has also had to face the formidable task of providing sufferers with enough supplies of anti-malaria drugs, particularly chloroquine. Hampered by lack of adequate pharmaceutical production facilities, however, this has not been easy. Quality control to ensure that chloroquine tablets conform to World Health Organization standards has represented another hurdle.

"The demand for chloroquine in this country", says T. K. Gupta, Deputy Production Manager of the Calcutta-based Bengal Immunity Company, "was 300 tons in 1978-79. By 1990 we expect this to reach 470 tons."

To make up a shortfall in domestic production, India has had to draw on its foreign-exchange reserves to import bulk supplies of chloroquine. The situation, though, has recently changed.

In 1981 the Indian Government turned to UNIDO — the United Nations Industrial Development Organization — for help in improving production technology and process control. Bengal Immunity was chosen as the focus of assistance because of its experience with anti-malaria drugs, dating back to 1945. When founded in 1919, it was the first Indian-owned

Since then its success had waxed and waned. "From 1955 onwards, we had been producing four tons of chloroquine phosphate per annum," Mr. Gupta explains. "But the cost of the drug is quite high, and the management of Bengal Immunity decided to discontinue production. Because the company was passing through a period of financial crisis, Government stepped in and took over in 1978".

With $400,000 from the UN Development Programme, UNIDO was able to supply the sort of modern expertise, sophisticated equipment and up-to-date training of staff needed to make Bengal Immunity a major chloroquine supplier for India. Filters and centrifuges to improve existing production techniques, as well as a battery of process-control instruments — otherwise unobtainable in the country — were brought in from abroad. Scientists and engineers were trained locally and in Europe in their operation and maintenance.

The result is one of the largest plants of its kind in Asia, with an annual capacity of 80 tons. Although initial production only began in 1985 Bengal Immunity was able to run out 80 million tablets to contribute to the Eradication Programme's 1985-86 campaign. The eventual goal is to nearly quadruple this figure.

While bringing relief to malaria patients, a ready supply of chloroquine can alleviate the sufferings of thousands of others in India as well. "Because clean water isn't always available in both the cities and the countryside", says Mr. Gupta, "amoebic infection is fairly common here. But chloroquine is also effective against amoebiasis, so we'll be serving two purposes by increasing the availability of the drug."

As well as freeing India's anti-malaria compaign from foreign exchange constraints, the project has an even wider scope in demonstrating to other developing countries that indigenous pharmaceutical manufacturing can be upgraded to meet their own needs for essential drugs.

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Small units plea to amend new DPCO

The small-scale bulk drugs and drug intermediate manufacturers have urged the Union Government to suitably amend the new Drugs Price Control Order (DPCO) of August 1987, so that they are not obliged to fix the price of bulk drugs on the basis of cost of production plus return.

Instead, there should be no direct price control on bulk prices manufactured by the small-scale sector and the prices fixed for the organised sector should be prescribed as the overall ceiling for the small sector.

The representative body of these manufacturers, the Indian Small-Scale Manufacturers' Association (ISSMA), has already met the Government officials in this connection and urged them to incorporate the necessary changes in the DPCO.

The association's President, Mr. Lalit Kumar Jain, said that the Government should also define drug intermediate in the new DPCO, so that the small-scale bulk drugs manufacturing sector could get its raw material easily and produce more bulk drugs. Mr. Jain has assured the Government that if drug intermediate is defined, his sector's share in total bulk drug production would go up from 40 per cent to 60 per cent.

Mr. Jain also pointed out that definition of drug intermediate would facilitate introduction of concessional customs duty on it as in the case of the basic bulk drug. Even the National Council for Drugs and Pharmaceuticals had recommended definition of drug intermediates to remove certain anomalies to boost its production in the small-scale sector.

There was also no price control on imported bulk drugs, Mr. Jain said pointing out that this would lead to large-scale imports and mainpulation of import prices. He, therefore, suggested that imported bulk drugs should also be brought under the purview of price control.

Referring to the need for amending the new DPCO, Mr. Jain said prices of bulk drugs were now sought to be fixed on the basis of cost of production plus return. The manufactures had to choose from the three options, namely a return of 14 per cent on net worth, a return of 22 per cent on capital employed and return of 12 per cent on long-term marginal cost in respect of new plants.

Mr. Jain argued that the net worth and the capital employed for the small units were relatively small, the prices based on such data would place them at a dis-advantage vis-a-vis the large units, which with large net worth and capital employed would be able to fix a relatively higher price for their drugs. This disadvantage would be felt more acutely by the small-scale sector as the large units would have the additional advantage of a larger market share and strong marketing network.

Moreover, small units did not have the necessary manpower and infrastructure to maintain the detailed cost records under the new DPCO. As such, the small units should be allowed to charge a price for their bulk drugs. which would not be more than the highest price charged by similar bulk drugs produced in the organised sector.

Mr. Jain argued that even the Kelkar Committee, set up by the Government, had suggested that there should be no price control on the small-scale sector. He also pleaded for waiver of formalities like filling up of forms for decontrolled bulk drugs, as the procedures would be cumbersome.

The ISSMA President, regretted that the new DPCO did not offer any incentive for the small units to expand their production independently.

He also referred to the large-scale smuggling that was taking place because of the relatively high price of some of the bulk drugs manufactured by large units in the country than the imported bulk drug price. Some of these drugs were chloramphenicol and ampicillin. The international price of ampicillin was $68 per kg. compared to Rs. 1,890 for the domestically produced variety.

GOVT. FOR MORE INTERACTION WITH DRUG INDUSTRY

The government proposes to have frequent interaction with the drug industry and trade for improving the quality and availability of essential drugs.

During a meeting with the drug industry represented by the Organisation of Pharmaceuticals Producers' of India (OPPI), Indian Drugs and Manufacturers Organisation (IDMA) and All India Chemists and Druggists' Organisation (AIDCO) the minister of state for petrochemicals, Mr. R. K. Jaichandra Singh and the secretary, Mr. H. K. Khan, assured the industry that the government was determined to ensure availability of quality drug at appropriate prices.

Steps were being taken to channelise new investment into pharmaceutical industry, encourage cost-effective production with economic sizes and to introduce new technologies and new drugs.

Steps were also being taken to strengthen the indigenous capability for the manufacture of drugs. The secretary informed the manufacturers that in consultation with the Bureau of Industrial Costs and Prices (BICP), effective and efficient systems have been worked out for revision of prices.

BANNED ABROAD, DECONTROLLED IN INDIA

The president-elect of Indian Medical Association, Dr. K. K. Shah, says that the drug policy not only allows the sale of at least 19 drugs which have been banned in other countries but also decontrols them.

For example, he said, basic drugs like analgin, clioquinol, oxyphenbutazone, phenylbutazone and oestrogeniprogesterone are among a score of drugs which are yet to be banned in this country.

Describing the drug policy as "anti-consumers" Dr. Shah says that multinationals should be banned from the drug scene within five years. Indian drug companies should produce only essential drugs in bulk.

"Social security scheme" which gives over Rs. one lakh to a doctor's family after his or her death, will be launched in all IMA branches, Dr. Shah said.

Dr. Shah regretted that the doctors' "public image" is deteriorating as the common man feels that doctors usually "fleece" the patients. More interaction between doctors and patients will help create a healthy relationship, he added. Out of 2.5 lakh doctors in the country, about 70,000 are IMA members.

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Interest in ozone substitutes

A new international agreement to protect the earth's ozone layer by limiting a widely-used substance has sparked interest in substitutes for the chemical.

The pact, signed by 24 nations on September 16 calls for curtailment of certain types of chlorofluorocarbons — chemicals that scientists believe attack the ozone layer which protects the earth from harmful ultraviolet rays.

The chemicals are used in aerosol sprays and as cooling agents.

Most of the world's producers of chlorofluorocarbons said it could take 10 years to produce alternatives in large volumes. However a Philadelphia company, Pennwalt, had been producing a substitute since 1979.

Last year a scientific panel convened by the U.S. Environmental Protection Agency concluded that several adequate substitutes were available, but the absence of market for the higher priced alternatives had slowed their manufacture.

Chlorofluorocarbons, also called CFC's are synthetic compounds of chlorine, fluorine and carbon first developed more than 50 years ago. The pact only limits those compounds that are harmful to the atmoshpere and particularly affects CFC-12, by far the most commonly used.

CFC-12 is used as a cooling agent in air conditioners and refrigerators, as a propellant in aerosol sprays, in the manufacture of plastic foam and as a cleaning solvent by the electronics industry.

Worldwide sales of the chemical total about $2.2 billion; $750 million in the US alone. The market for equipment that use it is even greater. Sales of refrigeration and air conditioning systems using chlorofluorocarbons reached $28 billion worldwide last year.

The ozone pact requires participating nations to keep the use of chlorofluorocarbons in 1989 at 1986 levels and then reduce consumption by 30 per cent by 1999.

Applications for alternatives now on the market are few, but chemical companies predict that demand will grow over the next five to 10 years as production of CFC-12 drops and its price rises.

Except for the frowing concern about the ozone layer, there was little incentive to come up with alternatives to the chemical until 1978, when the US banned its use in aerosol sprays.

Even that ban did not pose a serious problem for manufactuers, since in the rest of the world aerosol sprays remain the single largest use of this chemical.

Du Pont, the world's largest chlorofluorocarbon producer with 25 per cent of the market, said it had spent only $15 million since 1980 for research on alternatives.

For decades the substance was heralded as proof of better living through chemistry because it replaced such lethal refrigerants as ammonia and sulphur dioxide.

"CFC is really very desirable in most aspects", said Mr. Kevin Fay, Executive Director of the alliance for responsible CFC policy, an industry group.

"It's non-toxic, non-carcinogenic and non-flammable and it replaced things that are all of those" Mr. Fay said. "Ammonia and sulphur dioxide for example can kill you if they leak out."

CFC is also cheap. Pennwalt's alternative, for example, called CFC 1428/22, costs twice as much as CFC-12.

"But 12 will quickly go up in price because of the lack of availability and ours should come down as volume increases," said Pennwalt spokesman, Donna Caplan.

The Pennwalt compound has less than five per cent of the ozone depletion potential of CFC-12 and theoretically could be used in all of the same applications, Caplan said. However, she noted that the portion of the compound CFC-14-b can be flammable under extreme circustances.

Still, Pennwalt is the only company now producing a CFC-12 substitute and Caplan said three plants making the chemical could be geared up to meet demand in some markets.

Du Pont's two primary candidates for CFC-12 replacement are CFC-134 and CFC-22.

"We have done toxicity testing and we've got a pilot plant up and running," said Du Pont spokeswoman Kathy Forte. "But we think it will be five to seven years before they reach commercial market".

She said the company was pooling research on alternatives with its competitors in hopes of speeding it up.

BONN ACCENT ON CLEAN ENVIRONMENT

The Federal Republic of Germany is to become one of the first countries to give constitutional status to protection of the environment and nature conservation.

The ruling parties in Bonn have decided to include this objective in the federal constitution, thus underlining the State's responsibility for maintaining a healthy environment, the effective protection of nature, prudent use of the world's natural resources and repair of existing damage.

As part of the plans to expand protection of the environment the Government will initiate code of environmental legislation, introduce compulsory liability insurance against harm to the environment for all industrial enterprises and promote the manufacture of products qualifying for the 'Blue Angel" mark of environmental compatibility.

In taking action of this kind, the Federal Government has the broad support of the population and industry, try, even if it places obligations on them.

Some 3,000 environment officers are employed in industry to police the environmental regulations.

Environmental protection has spawned a whole new growth industry in Germany. There is a steadily expanding demand for goods and services for air purification, noise abatement, protection of water and waste disposal.

At present a good 50% of environmental investments by the private economy in Germany is spent on clean air and about 30 per cent on waste water disposal. The expanding environmental protection industry has developed into an important economic factor, exporting 30 per cent of its output.

East European countries, such as the Soviet Union, are showing keen interest in German environmental technology. Until recently, there was a demand for conventional disposal systems, but now the trend is towards environmentally compatible disposal technologies. However, development of these systems is costly — mainly because they have to be "tailormade".

XCESSIVE FERTILISER DISCOUNTS :

Four cos lose subsidy

The government has stopped the yment of fertiliser subsidy to four mpanies on the excess quantities ld by them at a discount.

This is the first time that the gov- nment has taken penal action against anufacturers who flouted the price scipline orders.

The four companies — two in the blic sector, one each in the coope- tive and the private sectors — had rlier been issued show-cause noti- es by the government. The notices ad said that the companies had sold sproportionately large quantities of ea in some states during June 1987.

The communication said that from e analysis of the sales data it ap- eared that possibly large quantities f urea had been sold at a discount violation of the decisions taken in e meeting of the Fertiliser Associa- ion of India held on June 11, 1987 nd in the meeting of the chief exe- utives held on July 2, 1987, under e chairmanship of the minister of tate for fertilisers.

The government had asked these ompanies to provide the break-up of ales made after June 17, 1987, indi- ating the terms and conditions off- red.

The penal action by the govern- ent demonstrates its earnest desire bring about discipline in the fertili- er industry and to stop the public ector manufacturers from "playing ith public money."

The government is hopeful that this ction will bring about the desired re- ults. However, it is pointed out that e government will not hesitate in king more stringent action if need s.

Earlier, in a communication sent by e fertiliser department to all public nd private sector units, it was made xplicit that violation of the price dis- ipline over and above the margin of s. 130 allowed by the government hether in the form of direct or in- rect, explicit or implicit, excluding redit terms in excess of those allow- d, would be construed as a corrupt ractice and attract action.

It was made clear that in case of rivate sector companies, such violations would be brought to the notice of the income-tax department under the Income-tax Act. As a penalty measure for violation, the allocations under the Essential Commodities Act of the errant companies would be reduced.

The executive director of the fertiliser industry co-ordination committee was advised by the government to release the subsidy payment only on a certification by the head of the company that no discounts over and above the margin fixed by the government were given.

The price war among fertiliser companies started about two years ago following a massive glut in the country. The glut is accounted for by the continuing imports of fertilisers in the country. Offtake has been limited by poor monsoon. Further, the onus of carrying the excess imported stocks now lie with the private companies.

RCF TOPS IN FERTILISER OUTPUT, SALES

The Rashtriya Chemicals and Fertilisers Ltd. has overtaken all other fertiliser manufacturers with a production of more than two million tonnes of fertilisers during 1986-87, registering an increase of 19 per cent over the previous year.

The sales turnover has exceeded Rs. 692 crores against Rs. 478 crores last year, securing for it the top place among the fertiliser manufacturers in the country, according to Mr. Duleep Singh, chairman and managing director of RCF. He presented the directors' report to the shareholders at the 9th annual general meeting of the company held in Bombay on Sept. 30.

Speaking at the annual general body meeting, Mr. Singh said the sluggish demand and floating marketing conditions had pegged the company's sales at Rs. 692 crores only against the sale value of production placed at Rs. 760 crores. He disclosed that the gross profit at Rs. 195 crores was an all time high record and was more than Rs. 29 crores as compared to 1985-88.

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News About New Projects

LEARANCE FOR AKC METHANOL ROJECT

The Government has cleared the plication of the AKC Group of com- nies for setting up a methanol pro- ct with an annual capacity of one kh tonnes. It has also assured the mpany on adequate supplies of na- ral gas/naphtha to enable expediti- us setting up of the project.

According to a press release issued y AKC Group of companies, the pro- ct costing about Rs. 80 crores will e located in Uttar Pradesh and will e the first gas-based project in North ndia to meet the demand of "indust- es located in this region of the coun- y.

Methanol is primarily used for pro- lucing formaldehyde, hexamine, ace- ic acid, dimethyl formamide, methyl mines, methyl halides and dimethyl erephthalate. It is also used as a sol- ent by the chemicals and paint in- lustry.

The project will be one of the lar- est in India and will use low tempe- ature, low-pressure, latest European echnology. The Uttar Pradesh State ndustries Development Corporation, State Government agency has offer- d 100 acres for this project.

At present, about 44,000 tonnes of ethanol is annually imported to meet e country's demand. This project ould thus substitute imports, besides roviding employment to about 300 ersons. The project would encourage etting up several downstream metha- ol-based units in nearby areas. Parti- ularly the synthetic resin, chemicals nd pharmaceutical industries in North dia would benefit from this plant.

AKC Group of companies is headed its Chairman, Mr. Ashok Chauhan, non-resident Indian based in West ermany. Mr. Chauhan is already in e petrochemicals area and his orga- sation is engaged in large-scale ma- facture and trading of petrochemi- ls.

RICHLOROETHYLENE PROJECT UKUMCHAND JUTE SIGNS MoU ITH JAPANESE CO

Hukumchand Jute and Industries mited has signed a memorandum of understanding with a Japanese firm for transfer of technology for its Rs. 8 crores trichloroethylene project.

Giving this information in Calcutta, Mr. M. C. Goenka, president of the company, said that all government clearances, including MRTP, had come through. A detailed project report will shortly be placed before financial institutions.

The project is to come up at Amlai in Madhya Pradesh where the company's chemical division is located and will have a capacity of 5,000 tonnes per annum (TPA) capacity.

At present there are only two trichloroethylene plants in the country, one belonging to Dharangdra Chemicals and the other to Mettur Chemicals, the total installed capacity being 10,000 TPA. However, actual production being in the region of only 5,000 TPA against a total demand in the country of 15,000 TPA, a good amount is presently being imported.

The company's caustic soda plant is being expanded and modernised, at a cost of Rs. 10 crores, Mr. Goenka said. A flaking unit is under installation and is expected to be commissioned next month. The capacity of the plant is being raised from 70 tonnes per day (TPD) to 100 TPD. With the completion of the modernisation-cum-expansion programme the company hopes to achieve a turnover of Rs. 5 crores from this unit.

ARAVALI FERT. TO GO AHEAD

Aravali Fertilisers Ltd., promoted by Zuari Chemicals Ltd., belonging to Mr. K. K. Birla group, is determined to go ahead with its Rs. 764-crore gas-based fertiliser project to be set up at Sawai Madhopur in Rajasthan.

Therefore, the question of either a delay in the implementation of the project or of even "dropping it altogether" does not at all arise, says Mr. H. S. Bawa, exceutive president of Zuari Chemicals.

In an informal chat with newsmen at Bombay on September 29, Mr Bawa said that work on this project had already begun. The company had already spent about Rs. 3.5 crores on preliminary work. Therefore, that was an on-going project, he said.

Snam Progetti of Italy will provide Aravali Fertilisers with urea technology and ammonia technology is to be obtained from Haldor Topsoe through Snam Progetti.

In line with the government's policy, the company is planning to minimise the foreign exchange outgo by making maximum utilisation of the services available in India.

Mr. Bawa said that Aravali Fertilisers had already initialled a draft agreement with Snam Progetti. This was subject to the approval of the government. Changes, if any, suggested by the government would be incorporated in the final agreement to be signed by the company with Snam Progetti, he said.

He said that the project was expected to be completed in 36 months from the time the collaboration agreement was signed and that the production might start in another three months thereafter. It was also possible that the whole project would be implemented well ahead of schedule, he said.

The foreign exchange component of the project may be of the order of Rs. 200 crores and the government is expected to provide facilities for meeting such expenditure.

The resources for meeting the rupee component (Rs. 564 crores) of the project are expected to be taken care of by the company itself. Of this, a part will be met by the contribution by the promoters towards the equity capital of Aravali Fertiliser. But the bulk of the rupee resources is likely to be raised by the company from the market by making use of the various financial instruments available. Only if necessary, it would approach the financial institutions for loans.

Replying to questions, Mr. Bawa said that the difficuities faced by the fertiliser industry was temporary. He was confident that the government would give good encouragement for its growth because it was in the core sector and the public sector had a major share in the industry.

Thanks to the measures taken by the government to regulate the supplies, a measure of price stability had been achieved. Fertiliser units were no longer obliged to offer huge discounts on their sales. It was true that the inventory of fertiliser with the units had gone up

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Chemexcil achieves better export

The Basic Chemicals, Pharmaceutical & Cosmetics Export Promotion Council, Bombay has recorded 18% grow- in exports during the year 1986-87. he figure stood at Rs. 561.93 croes. Giving this information Mr. Ramu . Deora Chairman of Chemexcil at he annual general meeting at Bombay on 29th Sept. said in part :

The value of International Trade in erms of U. S. Dollars increased by 0%, during 1986. World exports increased by U.S. Dollars 183 Billion, n 1986, or by 10.1% and World imports increased by U.S. Dollars 187 Billion or 9.9%.

Though the increase in World Trade, was the largest snice 1980, the Share of the Industrially developed countries continues to grow at a steady rate, while the share of the developing countries, in World exports and mports, continues to decline. Exports of industrialised countries grew by 16.3%, and imports 12.4%. In contrast, exports of developing countries fell by 5.9%, while imports increased by a modest 1.7%. These imbalances ed to a decline in the share of the developing countries, in the World Trade from 28.7%, in '85, to 24.6%, n '86. As regards Imports, their share fell from 27% in '85, to 25.2% in 86.

FOREIGN TRADE OF INDIA :

India's Performance, in Export Trade, during the Financial year '86-87, was better than her performance durng the preceding year '85-86, when there was hardly any growth in Exports.

During '86/87 exports were placed at Rs. 12,550 Crores Approximately, as compared to exports of Rs. 11,012 crores, during the previous year, giving satisfactory increase of 15% as against an average Annual growth of 7%, envisaged in the Seventh Plan period.

The total imports in '86-87 increased to Rs. 20,062 crores from Rs. 19,765 crores, during '85-86. These figures show a marginal reduction, in he Trade Deficit.

COUNCIL'S PERFORMANCE :

Against this background, the Export Performance of your Council is quite satisfactory. The total exports of the Council, during '86/87 was Rs. 561.93 crores, compared to last year, that is, '85/86, which was Rs. 478.04 crores, showing growth of 18% over '85/86. We have chalked out an Ambitious Target of Rs. 750 crores, for '87/88. An increase of 33%, over '86/87.

DIRECTION OF TRADE :

Though, East and West Europe continue to account for more than 50% of India's Exports, East Europe's share has declined to 34.1%, from 41.3%, during the previous year. The off-take of West Europe (23%), U.S.A., Canada and American countries (Approx. 15%), have remained almost unchanged. The share of African countries, have come down from 4.1% to 3%. The shortfall in exports to East Europe, and Africa is set-off by increase in exports to East Asia, which increased from 9.6% to 16.7%.

As regards individual countries, the USSR continues to be the biggest buyer of Indian Chemical Products Accounting for 32.8% of the Exports, followed by U.S.A. (14.1%), West Germany (5.8%), France (4.4%), U.K. (4.3%) and Japan (3.8%).

COMPOSITION OF TRADE :

Due to the commendable performance of the Captains of the Industry, we have reached a definite change, in the composition of our trade. Though exports of products like pharmaceutical finished formulations, castor Oil, cosmetics and toiletries, agarbattis and medicinal herbs, were almost stagnant, exports of chemicals/bulk drugs which included a number of new Products, increased to Rs. 87.16 Crores from Rs. 33.36 Crores, in '85/86, showing a growth of 161% over '85/86. Looking to this trend, we have fixed a target of Rs. 150 Crores in '87/88. The exports of dyes and dye intermediates, also increased to Rs. 98.67 crores, during the year under review, from Rs. 45.96 crores, during the previous year, a growth of 115% over '85/86. The exports of chemicals and agrochemicals, also increased from Rs. 61.89 Crores to Rs. 66.21 Crores. These could be achieved, only due to introduction of new products and captur-

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ing of new markets. The Foreign Exchange rates was also, a favourable factor, since german marks and other European Currencies, and Japanese Yen in comparison to Ind. Rs. and U. S. Dollar, have given an advantage to the Indian products, in the International Market. Over and above, China which was our main competitor in the European, Japanese and U. S. market, failed to fulfill its commitments in time and also substantially increased its prices, thereby giving an opportunty to Indian goods, in these sophisticated markets. We expect to do much better, in these markets, in the coming years.

EXPORT TARGETS :

The Government of India has fixed an ambitious target of Rs. 1000 crores for '89/90, against our actual export of Rs. 561.93 crores, during '86/87, envisaging a growth of 78%, in the terminal year of the 7th Five Year Plan. I am confident, with your support, we will definitely achieve the target fixed by the Ministry. I have always been emphasizing that India can become one of the leading exporters of chemical and pharmaceutical products, and achieve a target of Rs. 5000 crores by the turn of the century if some of the existing problems are resolved.

COUNCIL ACTIVITIES :

The Council continues to undertake a number of result oriented activities. A high powered committee under the chairmanship of Shri Prem Kumar, Commerce Secretary and Additional Secretary, Shri R. K. Dang, have been formed to monitor, the exports of our council, and a number of meetings have already been held, to examine the problems and prospects of exporters. Many new products, new markets have been identified. Thrust items have been selected for exports. As a result of these deliberations, and the meetings as well as follow up by the council, a number of measures have been announced by the government.

Though you are well aware, about the liberal and simplified procedures. announced by the Government, from time to time, as a passing reference, I would like to higlight some of the decisions taken by our Government for boosting our exports.

(A) The rate of export interest has been reduced from 12% to 9.5%.

(B) Large firms who export 60% of their production, will be allowed to manufacture selected goods from the reserved sector with good export possibilities provided the units are set up in backward areas.

(C) Agency commission of higher percentage has been allowed.

(D) Grant of CCS Support on Eleven items.

(E) Neutral Labelling for export of pharmaceutical formulations.

(F) 80 HHC — Income Tax Act.

(G) Exim Bank — drugs and formulations have been included in group 'B' list of Exim Bank's commodity credit for export on deferred payment terms.

(H) Supply of raw materials at international prices.

(I) Permitting manufacture of such new drugs for exports which are not allowed for marketing in India.

(J) Under the New Blanket permit scheme, Council items have been taken in priority, for allowing higher allocation of 10% foreign exchange for promotional activities.

(K) On Drugs manufactured from banned/restricted canalised items imported under advance licences, the scheme of prorata reduction from cash compensatory support entitlement has been abolished from 10th July 1987. This will give a big boost to our export efforts.

(L) Removal of floor price for psyllium husk.

Motivating the exporters

Though your Council, is functioning from its head quarters, in Bombay with Regional Offices in Bangolore and Calcutta, I have always tried my best to go to the various centres of production and particularly to areas, where SSI units are located like Sidhpur, Ahmedabad, Vapi, Hyderabad, Bangalore, Calcutta etc., to guide and motivate them to enter into export field. I am highly impressed and encouraged by the enthusiasm and participation shown by the SSI Sector for promotion of our Council's exports. Several meetings, and seminars were arranged, and lot of background material was given to the participants. They expressed their views, and problems connected with exports, frankly and fearlessly and the council, in turn left no stone

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ces, to the concerned government authorities both at the centre and the state. I am glad to inform you, that with the results of the personal talks, many SSI manufacturers have entered in the export arena, with overwhelming enthusiasm, and this is one of the biggest reasons, that the Council's export have boomed.

Outstanding problems

Although, many of the problems faced by the exporters have been considered sympathetically, and government have announced many schemes, some of our problems still remain unsolved. viz. :

(A) Inspite of accepted policy of the government still we have not been able to find a lasting solution to the problem of supplying intermediate products by one advance licence holder to another advance licence holder as per para 190(H) of current policy, such supplies are considered deemed exports, therefore, these should be made eligible for cash assistance, both under advance licence, and pass book schemes. Such a provision would generate employment and help export production. It is, therefore, urged that the anomaly in the policy may be corrected.

Drawback

The duty drawback scheme is found to be inadequate and non remission of export drawback in full has been known to have put our exports at a disadvantage.

The new all industry drawback rates made effective from 1.6.87 for several items of Council, are inadequate due to which exporters have been losing heavily. Also exporters cannot go for fixation of brand rates for individual items as all industry rates are slightly more than 75% of the intended brand rates. Therefore, these all industry rates should be abolished.

Drawback on Packing Material :

In the new drawback schedule, all industry rates on packing materials have been abolished. As such exporters are not able to recover any drawback on duty which has gone in the cost of raw material used for manufacture on packing materials. The Councils exports have been hit hard due to this change as packing materials like blass'n foil, glass bottles, vials, LDP and HDP containers, craft paper cartons etc. form substantial part of their cost of production.

Therefore, in the interest of the exporters of these products of the Council, all industry rates on raw materials used for manufacture of packing materials must be reinstated immediately.

Cash Compensatory Support :

CCS on some of our items like agarbattis, ayurvedic medicines etc. have been withdrawn from 1-6-86. Since then the Council is trying its best to get CCS reinstated. CCS on such products where we get 100% added value and give employment to rural workers should not be discontinued On the contrary such industry need encouragement.

AP MAY BID FOR GAS-BASED PLANT

The State Government is likely to stake its claim for setting up a urea plant based on gas from the Godavari Basin. It is stated that the existing gap in fertiliser availability is estimated to go up to 7.90 lakh tonnes by 1994-95.

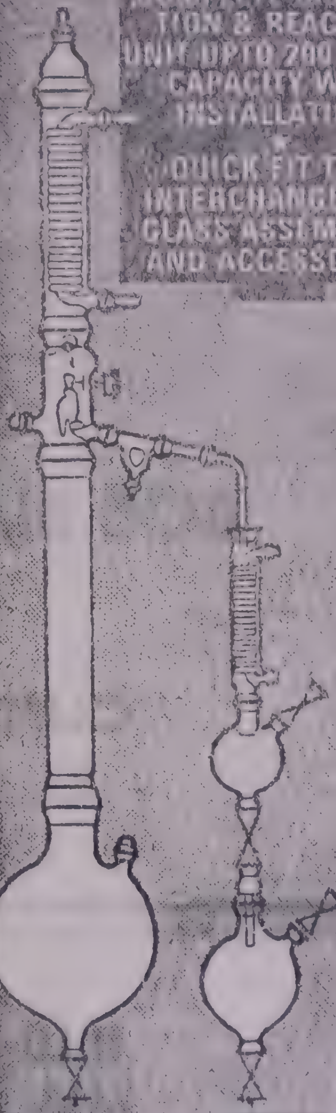
Considering that a large part of this gap in urea supplies will be felt more sharply in the four southern States and taking into account the huge transportation charges for fertiliser distribution, it is said that delivery to these farm-gates justifies the location of a plant on the coast at Kakinada.

Nagarjuna Fertilisers and Chemicals have already been licensed to set up a naphtha-based 900 TPA urea plant at Kakinada.

Godavari Fertilisers currently setting up a 1000 TPA plant in Hyderabad with firm support from IFFCO, may be asked by the Government to promote the gas-based urea project and secure clearances from the Centre.

Official circles point out that the gas from the Godavari Basin would be able to support not only requirements of Nagarjuna Fertilisers (after the shift from naphtha to gas) but also another urea-making unit, in addition to gas-based power generation (up to 300 mw) and a few sponge iron-making units.

Meanwhile, it is understood that the Dr. BHanu Prasad Committee report on gas utilisation in the Godavari Basin is under finalisation and its recommendation is awaited with interest by the industry.



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Carbon—Carbon composites with tailor made properties

The development of light weight, gh strength and stiff materials s been of particular interest for aterials scientists and aerospace chnologists. The first prerequisite r high strength in a material is rong chemical bonds between the oms. The strongest chemical nds in elements are of covalent ature and carbon is one of the ele- ents which forms such covalent onds. For graphite, the maximum eoretical strength is predicted to e one-tenth of the Young's modu- s. It is well known, however, that easured strength is some orders f magnitude less, due to cracks and rittleness of the mass material.

Though carbon and graphite con- ists of very strong bonds, the trength of these bonds is only par- ially utilised in common polycry- talline and polygranular carbon and raphite materials. The theoretical Young's modulus achieved in poly- ranular carbons is less than 0.2 per ent. In monolithic carbons, where- n the porosity is decreased, the Young's modulus achieved is 0.5 er cent of the theoretical value. This improvement in the achievable Young's modulus leads to further erfection of the crystal structure. By increasing the preferred orienta- ion and by decreasing the porosity n very fine carbons, 50 per cent of he theoretical Young's modulus ould be achieved in carbon fibres. This has been a major breakthrough n the late 1950s.

These fibres are used with a va- iety of matrix systems to produce range of fibre reinforced compo- ite materials. The use of carbon ibre reinforced polymer composites n sports goods (tennis rackets, fish- ng rods, golf sticks etc.), in medi- al appliances (X-ray beds) and in dvanced aeronautical engineering, (aeroplane wings, tails) is well known. Rather carbon fibre rein- forced polymer as well as cement composites are becoming more and more popular in every day life.

All conventional metals and alloys start losing strength at high tem- peratures (at 500°C and above). On the contrary, graphite is an attrac- tive material for elevated tempera- ture applications in inert atmosphere and ablative environments based on properties such as high sublimation temperature, thermal shock resist-

sing temperature etc. It has been extensively used for rocket nozzles, nose tip for reentry vehicles and hot press dies.

But some disadvantages associated with the bulk form of polycrystalline graphite and pyrolytic graphite such as low strain to failure, flaw sensitivity, high rate of ablation due to porosity and fabrication difficulties in making big sizes and complex shapes have limited the use of conventional graphite for advanced applications. The advent of carbon fibre technology offered the potential to overcome these problems. But if full utilisation of the excellent properties of carbon fibres is desired, they must be incorporated in bulk structures along with a matrix of the same element. This concept has led to a new class of materials that are known as carbon-carbon composites.

The most important attributes of carbon-carbon composites include low ablative recession, smooth ablative surfaces and high strength at elevated temperatures. Because of these properties, carbon-carbon is considered to be one of the most important structural materials for space applications such as nose tips and heat shields for reentry vehicles, high speed aerodynamically controlled vehicles, rocket nozzles, brake linings for advanced aeroplanes, high temperature moulds, and heating elements for making semiconductors.

Other exciting applications of this material are in the biomedical area. Carbon is a thromboresistant and bio-compatible material. Tissue growth is normal around carbon implant and hence this material is accepted by the body. Because of these properties, glassy carbon has been in use as heart valves, tooth implant etc. Because of low mechanical properties, glassy carbon could not be used as load bearing bio-implants. The development of carbon-carbon composites, wherein the material is both bio-compatible and strong enough, has extended the use of these materials in load bearing implants as well, such as bone plate and total hip prosthesis. Properties of composites can be tailor made as per the requirements of the implant.

The mechanical properties of carbon fibre reinforced carbon composites depend at least on

— the mechanical properties of the components themselves — of carbon fibres and carbon matrix.

— fibre/matrix interaction. This includes constructional parameters regarding geometry and arrangement of fibres and processing procedures which determine the density and structure of the matrix material within the fibre bundle.

— matrix-matrix interaction. This is more important in case of brittle matrix system.

Carbon-carbon composites in principle, constitute deposition of carbon around and in between the carbon fibres. Carbon fibres can be arranged in a single direction known as unidirectional reinforcement or can be woven into cloth as in 2D reinforced composites or as carbon preforms in multidirectional reinforcements.

On the basis of required thermomechanical properties, namely, strength, thermal shock resistance, thermal conductivity and ablation resistance fibre preforms are made with selected arrays of graphite fibre or carbon fibres in predetermined geometry with particular directions, spacing and fibre packing ratios. These can be 3D in which the fibre bundles are in three principal axes X, Y and Z or 7D structure consisting of orthogonally arranged bundles with additional fibre bundles running along all four diagonals of the 3D unit cell cubes. These different geometries contain voids of different shapes and sizes which accordingly affect the accessibility to gas permeation and the final density and mechanical properties of C/C composites. The maximum strength of multidirectional reinforced carbon-carbon composites lies in the direction of the reinforcing fibre bundles. The fibre packing in any direction can be varied so as to have higher strength in that direction. Thus, by choosing proper direction, geometry and fibre packing one can have composites with tailor made properties.

UD, 2D as well as multidirectional preforms are retained to their geometry by soaking and curing them in a thermo-set resin like phenolic, polyimide, polyphenylene type or thermoplastic resins like pitch. These are known as green composites. These green composites are then carbonised at a predetermined heating rate and in case of coal tar pitch under pressure to have high carbon yield and hence dense composites. During pyrolysis of resin matrix, composites suffer weight loss of 20 per cent or as high as 40 per cent depending upon the cock yield of the resin matrix and pyrolysis conditions. Because of this weight loss, cracks and fissures develop and often there is a gap between fibres and matrix. Hence one gets porous C/C composites. In order to have better translation of fibre properties and fibre matrix interactions, these pores have to be filled up. Further densification can be done in two ways — CVD infiltration and liquid infiltration.

The CVD infiltration is used to infiltrate porous carbon-carbon composites as well as fibre preform as such. This is also termed as gaseous infiltration in which the feed gas, usually hydrocarbons, undergoes a series of vapour phase interactions with the hot phase of the substrate, to deposit carbon as it diffuses into the preform. In addition it takes a lot of time (around 2000 h) to cause densification. Moreover, only thin-walled composites can be infiltrated by this technique.

For advanced applications such as nose tip, high density and proper microstructure of the matrix to inhibit oxidation are the main criteria. High density C/C composites can be made using liquid infiltration technique.

As stated above, the pyrolysed C/C skeleton, though a rigid structure, has low density and high open porosity. This porous composite is further densified by impregnation with high char yielding liquid resins or pitches. After every impregnating cycle, the composite is carbonised to 1000°C thereby increasing the density of the compositics. These densification cycles are repeated many times till the required density is achieved.

The perfection of C/C processing technology lies in achieving high density C/C composites with less number of densification cycles. These cycles can be reduced by properly choosing the type of reinforcing fibres (high strength or high modulus type carbon fibres) and weave construction which control the pore size distribution and the densification conditions like impregnating pressure, temperature and heat treatment conditions.

Though the densities of the composites made with different fabric systems are the same in the beginning, the improvement in density on further densification is much higher in graphitised carbon fabric. This in turn is due to the favourable matrix structure around and in between carbon fibre bundles and proper pore structure. The open pore structure leading to better densification and high ultimate density can also be obtained by using a novel technique developed at the National Physical Laboratory, Delhi.

In conventional polymer composites, the mechanical properties of the composites depend mainly on mechanical properties of reinforcing fibres; volume fraction of the fibres; and bonding of matrix system to the fibres, so as to effectively distribute the stress among the fibres.

The mechanical properties or the microstructure of the matrix does not contribute appreciably to the mechanical properties of the composites. This is not the case with carbon-carbon composites. In these composites, the matrix being of the same element as that of the fibre, the microstructure of the matrix has a great bearing on the overall mechanical properties of the composites.

Along with the low density and high mechanical properties of the composites, the other very striking feature of these composites is their excellent thermal properties. C-C composites possess low specific heat (1.3 J/gm°C) and low thermal conductivity. Being a fibre reinforced material, thermal expansion of these composites will be different in different directions depending on the reinforcement direction. For 2D composites at 900°C the coefficient of thermal expansion in the direction perpendicular to lay up is around 8×10^{-6}/K which in the direction parallel to lay up is -0.5×10^{-6}/K. These values are very low as compared to those for high temperature materials. This is the characteristic property which makes carbon-carbon composite a very promising high temperature structural material.

In defence and space applications, C-C composites have to be operated at high temperatures. One of the major problems encountered with these composites at high temperatures is their sensitivity to oxidation. Studies have been made in NPL on the oxidation behaviour of carbon fibres and carbon-carbon composites upto 1000°C. It has been found that the oxidation behaviour of carbon fibres and carbon-carbon composite is a complex phenomenon and depends on a number of factors such as microstructure of carbon fibres and matrix, porosity, pore size distribution, nature of porosity, surface area, active surface area, chemical composition of impurities present, density, nature of interphase between fibres and matrix. The oxidation resistance of carbon-carbon composites goes on increasing with heat-treatment temperature. Processing condition and particularly in between graphitisation during processing helps a lot in increasing the oxidation resistance of carbon-carbon composites.

Usually unidirectional composites are made to study the basic development of carbon-carbon composites. For actual applications, usually 2D and more often 3D and multidirectional reinforcements are utilised. It is more important to use the latter type of reinforcement for making advanced composites for use under hyperthermal environments when the composite is subjected to high temperatures at very high speed. Work has been carried out at NPL to develop 3D carbon-carbon composites for nose tip applications. A 3D orthogonally woven preform has been densified using liquid impregnation/carbonisation technique. The processing parameters evaluated by basic studies on UD and 2D composites are used for densification of 3D composite. These composites have been examined by x-ray holography and are found to have uniform density throughout the composite.

Excerpts from article in NPL Technical Bulleti

Pollution control at Cochin refinery

The most predominant air pollutants from a petroleum refinery are hydrocarbon vapours, catalyst fines and toxic gases like carbon monoxide and hydrogen sulphide.

Vaporisation of light hydrocarbons is minimised by storing volatile products in floating roof tanks. Hydrocarbon gases evolved during the process are consumed internally as fuel and any excess quantity of hydrocarbon generated due to process upsets is burnt off in the flare system.

However, carbon monoxide (CO) is generated continuously from the catalyst regeneration section of a fluidised catalytic unit. Along with carbon monoxide very fine particles of catalyst varying between twenty to thirty microns size are also emitted.

The Cochin Refineries Limited has now installed a carbon monoxide boiler, with an electrostatic precipitator (ESP) which will serve the dual purpose of economy and pollution control. While the CO boiler uses carbon monoxide as fuel and recovers waste heat (a saving of over Rs. one crore to the refinery), ESP removes the catalyst fines from the exhaust gases and lets out only dust free flue gas to the atmosphere.

The Cochin Refineries is the first in India to install an ESP for recovery of catalyst fines and to combat pollution. The ESP was designed by the air control division of UOP of the U.S.

The Cochin Refineries has also installed elaborate facilities for treatment of process water streams from various sections. First, oil from the water is recovered in an oil separator known as API separator. The oily water enters a long channel, provided with paddles, which move in a longitudinal direction. Long residence time from feed end to the discharge end and gentle agitation results in the separation of oil, which is collected continuously through a draw pipe. The collected oil known as "slop oil" is pumped back for reprocessing.

The effluent water from this section is then treated with chemicals for neutralising mercaptans, phenols, cyanides etc. The water is then subjected to biochemical treatment and clarification before it is discharged into the nearby Chitrapuzha.

— **The Hindu**

BLOOD PRODUCTS FROM NEW U.K. LAB

Britain has recently opened a £ 55 million Blood Products Laboratory that will make about 20 therapeutic products froom plasma — the fluid that remains once the blood cells have been removed from whole blood.

The products manufactured by the Laboratory fall into three main categories. The first are freeze-dried coagulation factors used in the treatment of blood coagulation disorders such as haemophilia. Then there are albumin products used to maintain plasma volume following burns or other injuries and during treatment for several clinical disorders. The third category is immunoglobins, human antibodies used to prevent viral and bacterial diseases.

With AIDS and hepatitis as major threats, stringent controls are applied throughout every process and the production areas contain the most modern centrifuges, heat treatment equipment and filtration systems to ensure that all the Centre's products are free from such diseases.

CHARCOAL WITH CLEAN PYROLYSER

The French company Framatome has developed a high performance pyrolyser that uses pollution-free techniques to transform lumber industry waste (and other forms of biomass) into high quality charcoal.

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EASTERN REGION OIL FIELDS

Output may touch 4.7 mt.

By 1990, ONGC's crude production from oil fields in eastern region covering Assam and north-eastern states (except Tripura) is likely to cross the targeted 4.1 million tonnes and touch the level of 4.7 million tonnes. During the period from 1980-81 to 1986-87, ONGC's production in the region jumped from 42 lakh tonnes to 2.68 million tonnes representing 538 per cent increase. The target for the current year (1987-88) has been set at 2..8 million tonnes. Table 1 gives the increase in crude production over the years.

TABLE — 1 PRODUCTION IN MILLION TONNES

Year	Production	Index
1981-82	1.875	100
1982-83	2.185	122
1983-84	2.186	123
1984-85	2.228	125
1985-86	2.393	134
1986-87	2.675	150

During the same period the production of Oil India Limited, another public sector company engaged in exploration and production of oil in Assam, on the other hand, declined from 2.9 million tonnes to 2.6 million tonnes. Table 2 gives OIL's production over the years.

TABLE — 2 PRODUCTION IN MILLION TONNES

Year	Production
1981-82	2.90
1982-83	2.83
1983-84	2.89
1984-85	2.75
1985-86	2.65
1986-87	2.60

Another major achievement of ONGC has been in gas supplies. During 1986-87, ONGC supplied nearly 94 million cubic metres of natural gas to gas-based power stations of the Assam state electricity board. About 12.5 million cubic metres of gas was supplied to the Namrup unit of Hindustan Fertiliser Corporation and more than six million cubic metres to different tea processing units in Assam during the period. During the past six years, nearly 136 million tonnes of new reserves of oil and gas have been added in the region.

ONGC sources would attribute the increased production in eastern region to several factors. First, the discovery of new oil fields. In addition to Lakwa, Lakhmani, Gelaki and Rudrasagar, eight new oil fields have been established in the past three years. These are Borholla, Champang, Amguri, Charali, Changmaigaon, Demulgaon, Kaurgaon and Namti. Next, drilling operation has been stepped up wherever significant discoveries have been made. As against 13 rigs in the beginning of the Sixth Plan, there are now 37 rigs operating in the region. Finally, several innovations like dragging the rig, clustered drilling and modifications of the mast have resulted in cost reduction of drilling operation. Improving well productivity, systematic use of artificial lifts and adoption of early production systems for putting new discoveries on production, among other measures, have been adopted to achieve the target. The introduction of new technology like mobile worker rigs, endless tubing unit, nitrogen pumping unit and other stimulation services and the use of chemical deoiler too have contributed to the galvanizing of operations in the region.

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UCIL allays fears over pull out

The chairman of Union Carbide In-a Limited (UCIL) Mr. V. P. Gokhale, s dispelled shareholders' apprehenon that the company was pulling out India.

Addressing the company's 52nd anual general meeting in Calcutta, Mr. okhale said that to the best of his nowledge, no agreement had been enered into with Ralston Purina of USA r taking over UCIL's battery-related perations in India. Incidentally, Ralsn Purina has bought up some of UCL's battery division in other parts of e world.

Shareholders expressed fears that JCIL might be wanting to wind up its usiness in this country since the chenical and plastics unit at Chembur ad been shut down and not re-opened. Responding to this, the chairman explained that the Union government had nsisted on relocation of all units which involved production of hazardous materials. However, UCIL had ound it unviable to relocate the Chembur unit.

Referring to a recent Union governnent notification he said the governnent had stipulated that a new LDPE lant would have to be of a minimum apacity of 90,000 tpa. However, a roject feasibility report had revealed hat ethylene a major raw material vould not be available in abundant uantity till 1994-95. Another reason or the company not relocating the hembur unit, the chairman said, was ne Supreme Court order relating to ompensation for workers in case of n accident.

Commenting on the performance of ne company, he said that adverse narket conditions for batteries, the laims relating to the Bhopal tragedy nd the closure of the Chembur unit ad together been a big financial strain r the company.

Sales turnover for the year ended ecember 1986, stood at Rs. 214.84 rores as against Rs. 241.92 crores in 985. Profit before tax was lower at s. 10.84 crores in comparison with s. 14.97 crores in the previous year. rofit after tax, however, was up at Rs. .01 crores as against Rs. 13.47 lakhs 1985.

As such UCIL was in a position to issue a reasonable dividend of 12 per cent for 1986.

AROMATICS PROJECT : MRL SEEKS 'STAGE-I' CLEARANCE

Madras Refineries Ltd. (MRL) is understood to have sought the Centre's "stage-one clearance" for the proposed aromatics complex in Madras.

The MRL application to the Centre also covers a plea for expenditure up to Rs. 30 crores towards "technical and other spade-work" for the aromatics project, slated to cost over Rs. 800 crores.

The Centre is said to be studying the MRL request. Under the prevailing norms for the clearances of major economic projects, the Centre has often given a "stage-one clearance", pending a close scrutiny of the detailed project report. If satisfied after such a scrutiny, the Centre gives the "stage-two clearance."

While the "stage-two clearance" is a green signal for a go-ahead on the project, the "stage-one clearance" is generally taken as "an approval in principle."

As for the MRL proposal for the aromatics project, the detailed project report, prepared by Engineers India Ltd., has also been submitted to the Centre. The DPR will come up for a decisive scrutiny only after the "stage-one clearance" given, it is said in informed quarters in Madras.

Also, it is only during the course of the intensive exercise for the "stage-two clearance" that a co-promoter for the Madras aromatics project will be chosen decisively, it is further said.

The MRL proposal entails the idea of joint venture. The significance is that the aromatics project could be set up either in the joint sector or indeed, in the public sector itself as a co-operative venture of MRL and one or more Central units (or, for that matter, a State Government unit).

IIIRD INTERNATIONAL SYMPOSIUM ON QUANTITATIVE LUMINESCENCE SPECTROMETRY IN BIOMEDICAL SCIENCES, 23-26 MAY 1989

This Conference, the third of its kind, to be held at the Faculty of Pharmaceutical Sciences of the State University of Ghent, envisages a report on the current status and future developments in the field of luminescence techniques used in drug quality control, clinical analysis, biochemical, toxicological and environmental analysis and in related areas.

Specific topics include drug and bioanalysis via fluorescence, laser fluorescence, delayed fluorescence, phosphorescence (LTP, RTP, micellar) and chemiluminescence; chemiluminescence immunoassays; thermochemiluminescence techniques; luminescence detection techniques in chromatography; chemical derivatization methods, the development of fluorogenic reagents; the development of highly specific and sensitive luminescent systems for the determination of macromolecules in biological samples; the use of expert systems in the analysis of luminescence data generated by HPLC; fibre optical sensors in bio-medical sciences; biomedical applications of luminescence in micellar and cyclodextrin media; the development of high resolution luminescence methods; use of fluorescence and chemi-luminescence labels and substrates; the fluorogenic estimation of enzyme activities; the use of three-dimensional fluorescence spectra; the application of computer-aided fluorescence spectroscopy to the determination of drugs and metabolites.

Outstanding specialists in the field of quantitative luminescence spectrometry will present recent developments through plenary, keynote and invited lectures. Original research papers can be presented as oral (20 min.) or poster communications.

A technical exhibition session (instruments, materials, books) will present newest developments in the field of analytical luminescence measuring instruments and an industrial forum will treat highlights in the field of luminescence analysis.

Symposium proceedings will be published in a special issue of Analytical Chimica Acta (Elsevier).

Further information can be had from Dr. Willy R. G. Baeyens, Symposium Chairman, State University of Ghent Pharmaceutical Institute, Laboratory of Pharmaceutical Chemistry and Drug Quality Control, Harelbekestraat 72 B-9000-Ghent Belgium. Tel 091/21 89.51 ext. 254.

Gas-based steel plant: mecon bags contract

The Metallurgical and Engineering Consultants of India Limited (Mecon) has bagged a prestigious project for construction of a gas-based steel plant, the first of its kind in the country, at Hazira in Gujarat.

Official sources said Mecon had been retained by Essar Steels, a division of Essar Construction for design engineering, consultancy, project and construction management services for construction of the plant with a production capacity of 8.8 lakh tonnes per annum.

The sources said the project will be completed by middle of 1989 and cost about Rs. 260 crores. The gas will be made available from the Bombay High.

Sources said Mecon had also been entrusted with the job of consultancy, design, engineering and project and construction management services by Integrated Steels Limited of Bombay for their 150,000 tonnes capacity mini steel plant which will produce flat rolled products. The plant will be set up at Wardha. The work on this project has already commenced.

It has received an assignment from Indonesia for assisting in the commissioning and trial run of a one million tonne capacity cold rolling mill complex at Cilecon.

In the area of environmental engineering, the company has made steady progress and bagged a number of assignments from various public sector organisations.

The company has set up a pollution control laboratory for undertaking site measurements of pollutants. Computer is being extensively used in the area of pollution control engineering.

Mecon, according to the sources, has taken up the task of modernising blast furnaces by designing the equipment and systems and installation of the same including performance guarantee.

The blast furnace number four of Indian Iron and Steel Company Limited (IISCO) was modernised with movable throat armour and over-burden probe designed and installed by Mecon.

Similarly, the company installed throat armour for the blast furnace number three at Rourkela Steel Plant. Recently, it has received an order for installing movable throat armour and overburden probe for a blast furnace of Durgapur Steel Plant.

Mecon has designed the benzol recovery, refining, and rectification plant for Bokaro Steel Plant under expansion. This plant is the largest of its kind in the country, the sources added. The plant was entirely designed by Mecon and the process design was also supplied by it.

VSP has assigned it with turnkey responsibilities. Mecon, for the first time, is designing hydro-refining of benzol for VSP.

Sources said the modernisation of Durgapur Steel Plant (DSP) has been approved by the government of India and Mecon is rendering design, engineering, project and construction management services for the project.

Mecon will be undertaking project and construction management services besides design and engineering work to ensure completion of the project on time.

In the area of coke ovens, IISCO has assigned the company with the job of design, supply, erection and commissioning of their coke oven battery number nine on turnkey basis. This job is making steady progress and will be completed on time, the sources said.

NEW BODY MOOTED FOR SCIENCE FUNDING

The members of the science advisory council to the Prime Minister, Mr. Rajiv Gandhi, called for the setting up of an independent organisation like the National Science Foundation or a National Science Board for the funding of science on a long-term basis.

This suggestion was made at the informal meeting between the council members and the planning minister, Mr. Shiv Shankar, who is also the deputy chairman of the Planning Commission.

The meeting agreed that a paper will be prepared expressing the views of the science advisory council to the Prime Minister and sent to the Planning Commission for more effective co-ordination.

According to an official press release issued in New Delhi, Mr. Shiv Shankar, initiating the discussions, said the Planning Commission was keen to derive the benefit of science and technology in decision-making process as also in the preparation of the perspective plan for the year 2001 A.D.

The observations of the members of the science advisory council to the prime minister basically pertained to fixation of realistc targets implementation, strategies coordination, monitoring, fixation of priorities, selecting and funding for some important areas to bridge the gap in scientific development.

It was agreed that many of these steps had been taken note of for evolving plans for science and technology sectors in the Sixth and Seventh Plans but what was needed was more effective and speedier implementation of these ideas.

The economic aspect in the perspective plan, science and technology in plan implementation, fixation of realistic target relating to national objectives, priorities etc., was also discussed in the meeting.

RATNASAMY JOINS "ZEOLITES"

Dr. Paul Ratnasamy, head, inorganic chemistry division, National Chemical Laboratory (NCL), has been invited to join the international editorial board of "Zeolites" for a period of three years.

Zeolites a bimonthly international journal from the USA is one of the most prestigious journals in the area of catalysis.

Dr. Ratnasamy is the first Indian and and the second Asian to be honoured with this distinguished editorship.

Dr. Ratnasamy has contributed significantly to the development of novel Zeolites catalysts (designated as encilites which stands for NCL Zeolites). Dr. Ratnasamy's outstanding research in applied catalysis has both proven and potential impact in petroleum refining and petrochemical industry.

Among the important products that are produced by processes based on these catalysts are Xylenes, ethylbenzene and light olefins. As a result of the dedicated efforts of Dr. Ratnasamy the monopoly that some international companies had over certain vital industrial processes has been broken and NCL has become an internationally recognised institution in this area of research.

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Industrial licences and LI's issued in June

The following is the list of industrial licences/letters of intent issued under the industries (Development & Regulation) Act, 1951 During June, 1987.

S.. No. Name of Undertaking Location and Type of IL, Item of Manufacture and Annual Capacity are given in that order :

Scheduled Industry No. 19: Chemical (other than fertilizers)

1. Manish Organics India Ltd., 1 National Chambers, Ashram Road, Ahmedabad. (NA) : Ankleshwar, Bharuch, Gujarat: Acetaldehyde: 3,600 tns.

2. Hoechst India Ltd., Hoechst House, Nariman Point, Backbay Reclamation, Bombay (NU): Ankleshwar, Bharuch, Gujarat: Isoproturon: 400 tns.

3. Hindustan Lever Ltd., Hindustan Lever House 165/166 Backbay Reclamation, Bombay (NU): Bharwa Sumerpur, Hamirpur, Uttar Pradesh: Synthetic Detergents: 30,000 tns.

4. Sandoz (India) Limited, Sandoz House, Dr. Annie Besant Road, Worli, Bombay. (NU): Panoli Bharuch, Gujarat, 1. Fat Liquors: 1,200 tns. 2. Synthetic Tanning Agents: 400 tonnes. 3. Leather Processing Chemicals: 1,000 'tns. 4. Leather Finishing Chemicals: 1,400 tns.

5. Haryana Leather Chemicals Ltd., 2, Tribune Colony, Ambala Cantt. Haryana. (NU): Jind, Haryana: Leather Chemical and Auxiliaries, Fat Liquors N.C. Lacquers, Base Coats, Compact Dyes, Pigment etc., 1,510 tns.

6. Gujarat State Fertilizers Co. Ltd., (Polymers Unit) P.O. Fertilizernagar, Vadodara, Gujarat. (N.A.): Baroda Gujarat: Methacrylic Acid: 500 tns.

Scheduled Industry No. 22: Drugs & Pharmaceuticals

7. Hoechst India Ltd., Hoechst House, Nariman Point, Backbay Reclamation, Bombay. (NU): Ankleswar, Bharuch, Gujarat : Batrafen (Cylopiroxolamine) and formulations based thereon: 2 tns.

8. Ranbaxy Laboratories Ltd., Devika Towar, 6 Nehru Place, New Delhi. 1. (NA): S.A.S. Nagar, Ropar, Punjab and 2. Dewas, Madhya Pradesh: 1. Ranitidine Bulk Drug: 3 tns. 2. Ranitidine Formulations: 2. 1 tns.

9. Pefco Industries Limited, E-14 & 15, Bosari Industrial Area, Pune. (NA): Roha, Raigarh, Maharashtra: D-Naproxen: 10 tns.

10. Modipon Limited, Modinagar-201204, Uttar Pradesh (SE): Tehsil Modinagar, Distt. Ghaziabad, Uttar Pradesh: Polyester Filament Yarn : 15,000 tonnes (After Expn.)

11. Rallis India Ltd., United India Life Bldg., F-Block, Connaught Place, New Delhi-110 001 (SE): Tehsil Dera Bassi, distt. Patiala, Punjab: Fenvalerate Technical : 200 tonnes (After Expn.)

12. Indian Sulphacid Industries Limited, G. T. Road, P.O. Shahabad Markanda Distt. Kurukshetra, Haryana (SE) : Tehsil Shahabad Distt. Kurukshetra, Haryana: Alumina Ferric: 24,000 tonnes (After Expn.)

13. Hindustan Organic Chemicals Limited, (A Government of India Enterprise) P. O. Rasayeni Distt. Raigad, Maharashtra-100207 (SE): Rasayani, Tehsil Panvel, Distt. Raigad, Maharashtra: Formaldehyde: 30,000 tonnes (After Expn.)

14. Goodlass Nerolac Paints Limited, Nerolac House Ganpatrao Kadam Marg, Lower Parel, Bombay-400 013. (NU): Tehsil Rewari Distt. Mahendergarh Haryana: Paints, Varnishes & Enamels: 15,000 M.T.

15. The Southern Pesticides Corporation Limited, 10-5-3/2/2 Masab Tank, Hyderabad-500 028, Andhra Pradesh (NA) : Tehsil Kovur, Distt. West godavari Andhra Pradesh : 1. Dichlorvos, 2. Methyl Parathion, 3. Endosulfan, 4. Cypermethrin, 5. Fenvalerate, 6. Malathion, 7. Phosphamidon, 8. Butachlor, 9. Quinalphos, 10. Dimethoate, 11. Chlorpyriphos 12. Monocrotophos, 13. Dicofol: 322 tonnes.

16. Uttar Pradesh Carbide and Chemicals Limited, 59/4, Rajput Road, Dehradun — 248 001 (NA); Distt. Dehradun, Uttar Pradesh: 1. Trichloroethylene; 2. Tetrachloroethane: 5,000 tonnes.

17. Gujarat Alkalies & Chemicals Ltd., P.O. Petrochemicals 391, 346 District Baroda, Gujarat (NA): Baroda, Tehsil Ranoli, Distt. Baroda Gujarat: 1. Potassium Hydroxide: 16,500 MT, 2. Potassium Carbonate: 15,000 MT.

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18. JKBM Limited, 2, Mangoe Lane, alcutta-700 001 (NA): Tehsil Ank- shwar, District Bharuch, Gujarat: 1. ethyl Thiophenates: 200 tonnes.

19. Shaw Wallace & Co. Ltd., 4, ankshall Street, Calcutta (NA): Teh- l Haldia Dist Midnapore, West Ben- al: Acephate (Technical): 200 ton- es.

20. Ashok V. Patel, 29, Atamjyoti agar Society, Atamjyoti Ashram Rd., pp. Atamjyoti Mandir, Baroda-390- 07, Gujarat (NU); Dist. Baroda, Gu- arat: 1. Para-nitro chlorobenzene: ,200 tonnes, 2. Orthonitro, chloro- enzene: 600 tonnes, 3. Acetanilide: ,200 tonnes.

21. Surya Agroils Ltd.., 3, Scindia ouse, Janpath, New Delhi-110 001 NU): Salamatpur; Tehsil & Distt. Rai- sen MP: Methyl Ester-its derivatives nd its Sulphonated products: Sulpho- ated Surfactants: 10,000 MT.

22. Apar Private Ltd., Maker Cham- ers-III, Jamnalal Bajaj Marg, Nari- man Point, Bombay-400 021 (NU); ny Centrally declared Backward Distt. ujarat: Acrylonitrile Butadiene Rub- ers and Latexes: 5,000 tonnes.

23. V. V. Nathan Intra Metal Private imited, 20, A. Basant Lok Complex asan Vihar, New Delhi-110 057 (NU): amnjodi, Distt. Koraput, Orissa: Lime of quality other than that for constr- ction and lime wash which is reserv- d for the small sector): 45,000 ton- es.

24.P.H.C. Lal, 44, H. Maker Tower, uffe Parade, Bombay-400 005 (NU); ny backward area Maharashtra; SOF ross over laid industrial packaging einforcement material unlaminated nd/or laminated with paper/film/ luminium/foil sheet styro foam/non- oven fabric and heavy duty bags ereof: 3,340 tonnes.

25. Hindustan Organic Chemicals imited, Rasayani, Raigad Distt. Ma- arashtra-410 207 (NA): Ambalamu- al, Distt. Ernakulam, Kerala: 1. Epi- lorohydrin: 5,000 tonnes; 2. Hydro- loric Acid: 16,000 tonnes; 3. 1.2 ichloropropane and 1.3 Dichloropro- ane 500 tonnes; 4. Glycerine: 4,000 nnes.

26. Modipon Limited, Modinagar- 01 204, Uttar Pradesh (SE): Tehsil: odinagar, Distt. Ghaziabad, Uttar adesh: Nylon Filament Yarn: 12,000 nnes (after expan).

27. Vam Organic Chemicals Limited, Skyline House, 85, Nehru Place, New Delhi-110 019 (NU): Tehsil Kashipur, Distt. Nainital, Uttar Pradesh: Ethylene Vinyl Acetate Copolymer: 6,000 tonnes.

28. LEM Mohta AJK Limited, 273, Mysore Road, Bangalore-560 026 (NU): Nunjongud Taluk of Mysore Distt., Karnataka: 1. Electronic Copper Clad Laminates, Industrial Laminates, Moulded Components: 2. Advanced Composites for Aero-Space: 200 tonnes. 3. Fire Protection Compounds: 600 tonnes, 4. Mica based Insulating Products: 100 tonnse.

Scheduled Industry No. 21 Dyestuffs

29. The Atul Products Ltd., P.O. Atul/Vapi, Distt. Valsad, Gujarat-20 (NA): 1.1,8-Diamino Naphthalene: 80 tons. 2.1,5-Diamino Naphthalene (by-product): 48 tonnes.

Scheduled Industry No. 22: Drugs & Pharmaceuticals

30. Vam Organic Chemicals Ltd., Skyline House, 85, Nehru Place, New Delhi-19 (NA): Teh. Hasanpur Distt. Moradabad, Uttar Pradesh: Aspirin: 2,000 tonnes.

31. Ambalal Sarabhai Enterprises Limited, S. G. Pharmaceuticals, Wadi, Baroda-7, Gujarat (NA): Ranoli, Distt. Baroda, Gujarat: Diclofenac Sodium bulk and its formulations: 5,000 kgs.

32. Ferro Alloys Corpn. Ltd., 42-Dakshineshwar, 10, Hailey Road, New Delhi-1 (NU): Distt. Bulandshahar, Uttar Pradesh: 1.6-Amino Penicillin Acid (6 APA): 200 tonnes. 2. Ampicillin/Amoxycillin Trihydrate: 135 tonnes.

33. Indian Organic Chemicals Ltd., New Excelsior Building, Wallace St., Bombay-1 (NA): Teh. Khalapour, Distt. Raigad, Maharashtra: 1.D (—) Phenylglycine 400 MT 3.D (—) Para-Hydroxy-Phenylglycine: 150 MT 4.D (—) Para - Hydroxy - Phenylglycine Chloride Hydrochloride: 100 MT 5.D (—) Para - Hydroxy Phenylglycine Dane Salt: 150 MT.

34. Pefco Industries Limited, Plot No. 10, Off Dr. E. Moses Road, Worli, Bombay-400 018 (NA): Dhatav, Tehsil Rona, Distt. Raigad, Maharashtra: 1.L-Methyl Dopa: 15 tonnes. 2. Ampicillin Tri Hydrate: 15 tonnes. 3. Propanolol Hydrochloride: 6 tonnes, 4. Hydro Chloro Thiozide: 6 tonnes. 5. Cephalexin Mono Hydrate: 15 tonnes, 6. Trimethoprim : 15 tonnes.

Scheduled Industry No. 26: Fermentation Industries

35. R. Rangaya 3-6-782/5, Himayatnagar, Hyderabad-29, Andhra Pradesh (NU) : Munagal Teh. Kodad Distt. Nalgonda, Andhra Pradesh : 1. Extra Neutral of Alcohol or High Grade Industrial Alcohol : 170,00,000 Ltrs. Technical Alcohol : 13,00,000 Ltrs. 3. Cattle Feed : 62,500 tns.

36. Punjab Agro Industries Corpn. Ltd, SCO No:315-316 Sector-35-B, Chandigarh (NU) : Dist.t Jullundhar Punjab : 1. Vodka: 69,00,000 litres, 2. Rectified spirit (for captive use): 27,60,000 litres.

Statement showing particulars of Industrial Licences Cancelled/Revoked etc. under the Industries (Development and Regulation) Act, 1951 during June, 1987

1. Amar Dye-Chem Ltd. Rang Udyan, Sitladevi Temple Road, Bombay : Maharashtra : Dyes for Acrylic Fibres: Cancelled.

Statement showing particulars of Letters of Intent Cancelled/Revoked etc. under the Industries (Development and Regulation) Act, 1951 during June, 1987.

1. Gujarat Aromatics Ltd., 301, Surya Kiran, 19, Kasturba Gandhi Marg, New Delhi; Gujarat: 4, Nitro Meta Cresol, etc: Lapsed.

2. The Indian Rayon Corporation Limited, Junagarh Road, Veravel-362-266: Falta EPZ Calcutta: Flaxyarn: Lapsed.

3. Lakhanpal Pvt. Ltd., 4/24, Asaf Ali Road, New Delhi-110 002: Goa: Colour TV sets: Cancelled.

4. PML Powders Pvt. Ltd., Parmeshwari Niwas, 7, Central Avenue, Nagpur-440 018: Haryana: Bronze Powder: Lapsed.

5. J.K. Chemicals Ltd., J. K. Building, N. Morarjee Marg, Ballard Estate, Bombay: Assam: Carbon Black: Cancelled.

6. The Star Wire (India) Ltd., 11, Clive Row, Calcutta-700 007: Haryana: Heat Exchangers, Pressure vessels, Water Treatment etc.: Lapsed.

7. Delhi Cloth Mills Limited, 18, Barakhamba Road, New Delhi-110 001: Rajasthan: Calcium Carbide: Cancelled.

8. Maharashtra Petro-chemicals Corpn. Ltd., C/o. Sicom Limited, Nirmal, 1st Floor, Nariman Point, Bombay-400 021: Maharashtra: Toluene Di-isocyanate etc: Lapsed.

9. T. K. Chemicals Ltd., Trivandrum: Kerala: Electrolytic Manganese Dioxide: Lapsed.

10. Indian Electro Chemicals Ltd., Ahmedabad (Gujarat): Gujarat: Sodium Formaldehyde Sulphoxylate etc: Lapsed.

11. Puri Construction (Bombay) Pvt. Ltd., G. T. Hospital Complex, Lokmanya Tilak Road, Bombay: Pure Gypsum Powder: Lapsed.

12. Apeejay Chemicals Ltd., New Delhi: Andhra Pradesh: Caustic Soda: Lapsed.

13. Orissa Mining Corpn. Ltd., Bhubaneshwar; Orissa: Electrolytic Manganese Di-oxide etc.: Lapsed.

14. Neelachal Flourides and Chemicals Ltd., Bhubaneshwar: Orissa: Aluminium Fluoride: Lapsed.

OVERSEAS TRADE CONTRACTS

The following are the short-dated important international bid invitations received by the Trade Fair Authority of India till 7th September, 1987. Firms in India interested in these tenders and desiring to participate in the same may approach the concerned tender inviting organisation immediately for obtaining the tender forms, specifications and conditions and also proceed to finalise other formalities. They may also contact the respective export promotion agency in India, if any, and concerned India Government Trade Representative in tender inviting country. Tender documents cannot be obtained from the Authority. Tender information as received by the Authority can be seen in Room No. G-36, Trade Fair Authority of India, Pragati Maidan, New Delhi between 3-4 p.m. on all working days. Details of other tender notices can be seen in the Indian Export Bulletin, Dated: September 19, 1987.

Chemicals and Auxiliaries

Tender No. 4823. For the supply of Chemicals and auxiliaries to the United Commercial Industrial Company (KHOUMASSIEH), P.O. Box 546, Damascus.

Further details are available from the above Tendering Authority.

Closing Date: October 17, 1987.

Quotation can be sent on the supplier's proforma invoice with f.o.b./c & f. price and total price.

Chemical for DEA System

Tender No. 4629. For the supply of Chemicals for DEA system to the Syrian Petroleum Company, P.O. Box 3378 or 2849, Damascus. Telex: 411031 or 411724 SYPCO SY.

Further details are available from the above Tendering Authority.

Closing Date: October 11, 1987.

Quotation can be sent on the supplier's proforma invoice with f.o.b./c. & f. price and total price.

Antifcamer and Diethanolamine

Tender No. 4869. For the supply of Antifoamer and diethanolamine to the Homes Refinery Company, P.O. Box 105, Damascus. Further details are available from the above Tendering Authority.

Closing Date: October 22, 1987.

Quotation can be sent on the supplier's proforma invoice with f.o.b./c. & f. price and total price.

Caustic Soda

Tender No. 4902. For the supply of Caustic Soda to the General Organisation of Food Industries, P.O. Box 105, Damascus. Further details are available from the above Tendering Authority.

Closing Date: October 22, 1987.

Quotation can be sent on the supplier's proforma invoice with f.o.b./c. & f. price and total price.

Calcium Silicon

Tender No. 5742. For the supply of Calcium silicon to the General Company of Iron and Steel Products, P.O. Box 24, Homs. Tlx: 431038 SY COSTEL. Further details are available from the above Tendering Authority.

Closing Date: October 10, 1987.

Quotation can be sent on the supplier's proforma invoice with f.o.b./c. & f. price and total price.

PANEL MOOTS SAFETY AUDIT

The scientific commission appointed by the Government of India to Union gate into the gas leak from the Union Carbide pesticide plant in December 1984, has suggested regular and periodic 'safety audit' of chemical factories and plants as a major step to prevent accidents like the Bhopal gas disaster.

The Chairman of the commission, Dr. C. R. Krishnamoorthy, said that that the commission had suggested to the Government to review its licensing policy for chemical industry, to enable it to monitor information on all matters concerning the chemicals to be used by the plants and their after effects on humans.

Dr. Krishnamoorthy said the commission, which was studying the long-term effects of the Bhopal gas disaster, had received reports of damages to the brain, lungs, eyes and even cancer cases among the affected but it would take at least five to 10 years of research to gauge the effect of the gas disaster. He, however, did not rule out the possibility of people not exposed to the gas also being affected.

Describing the children in the affected area as 'living testimony of the tragedy', he expressed concern over their future.

Replying to a question, Dr. Krishnamoorthy said even after 30 months, it had not been possible to determine the exact element or gas which caused the human tragedy. The evidence spoke of a big cloud which remained for about an hour, he said.

When asked why the commission could not determine the type of gas, he clarified that its objective was to find out its after-effects.

The commission's two-year tenure, which expired in August last, had been extended by another year, Dr. Krishnamoorthy said.

The commission, had submitted an interim report to the Government, he added.

CENTRE URGED TO SET UP ONGC OFFICE IN AP

The Andhra Pradesh minister for forests, Mr. Muddu Krishnama Naidu, has requested the Centre to locate the regional office of the Oil and Natural Gas Commission (ONGC) within the state as it had a seashore extending over 900 kms and an established potential in oil and natural gas.

According to Mr. Naidu, the setting up of the ONGC regional office in Madras had resulted in Andhra Pradesh not receiving its due share of the corporation's attention. There are currently 42 on-shore drilling units in Tamil Nadu as against 26 on-shore drilling units and 33 off-shore drilling units in Andhra Pradesh.

He said the state government would be willing to provide all facilities, including a site, if the ONGC were to shift its regional office to the state.

Fertiliser units face cutbacks

The fertiliser industry is in the roes of an unprecedented crisis and ost of the units are on the threshold l sickness.

The stocks held by the industry has sen to an alarming figure of four illion tonnes and unless the governent immediately releases funds towards the inventory-carrying costs of tleast the imported fertilisers, the ndustry will be left with the Hobon's choice of cutting production.

This grim picture was presented at news conference in Madras by Mr. oseph Kurian, chairman of the Fertiliser Association of India (FAI) and Ir. A.C. Muthiah, chairman of FAI's outhern regional council.

Mr. Kurian is the chairman of the ublic sector undertaking, Madras Fertilisers Limited, and Mr. Muthiah is he vice-chairman and president of he joint sector Spic.

Both minced no words in criticising the government's policy on fertiliser imports and arrangements for handling imported fertilisers.

They were firmly of the view that n the context of increased domestic roduction and the slackness in fertiliser consumption growth, the existing tock of four million tonnes is more or ess adequate to cover the requirements of the ensuring rabi season and ere was no reason why the government should persist in importing fertilisers against the industry's advice.

Mr. Muthiah said estimates of demand had been made on the basis of exaggerated consumption projections furnished by state agricultural departments and this was the root of the problem.

In a market already affected by drought, manufacturers were facing an acute liquidity problem and most of them had already turned sick.

The manufacturers were asked to open letters of credit and imports were landed on them. The government had stipulated that imported stocks should not be released and had also imposed restrictions on the release of indigenous production.

Against the normal inventory period agreed to by the government, manufacturers were being made to hold stocks for as long as six months. The government was committed in principle to bear the actual inventory costs but the money was not being released promptly.

"We are between the devil and the deep sea. If we hold the inventory and divert most of our internal resources towards interest charges, we will go deeper into the red. If we cut back on production, we will lose the subsidy."

He warned that if a core sector industry like the fertiliser industry was allowed to turn sick, the cancer of sickness would spread to other industries and it would take a long time to recover. He also criticised the government's move to withdraw the freight subsidy.

Mr. Kurian said in all fairness, the government should immediately release funds to compensate the inventory carrying costs. He also wanted a moratorium on payments by the industry for raw materials supplied by government agencies.

The Reserve Bank should also be directed to provide larger credit on softer terms to the fertiliser industry to tide over the liquidity crisis. "We do not have the wherewithal even for our day-to-day operations," the FAI chairman said.

IMPORT FACILITY TO RESEARCH INSTITUTIONS

Public funded research institutions are entitled to import consumables for research work subject to certain conditions.

This facility is being extended to all research institutions which are registered with DSIR and to all universities, but with a value limit of Rs. Two lakhs in a financial year subject to certain specified conditions, says an official release.

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306, Shri Hanuman Industrial Estate,
G. D. Ambekar Road, Wadala, Bombay-400 031.

New oil, gas discoveries in Western offshore

The Oil and Natural Gas Commision (ONGC) has claimed "a string of new discoveries" in the western offshore during the last three months that have "contributed substantially" in adding to the reserve of the region.

Two of the four recent strikes, an ONGC press note issued in New Delhi says, have been in Daman offshore. The discovery of gas in the C-22 and C-24 structures in Daman offshore have further brightened the prospects of this area.

Earlier oil/gas has been discovered in CA and CD structure in this area. So far, four out of the six wells drilled in this area have turned out to be hydrocarbon bearing.

The other significant oil and gas discoveries in the western offshore area have been in structure B134 and B-80.

The western offshore has 176 prospects of which 90 have so far been drilled over the years. The total oil reserves in western offshore have increased from 512 million tonnes (as on January 1, 1975) to 1596 million tonnes (as on January 1 last). Similarly the gas reserves have also recorded an over 10 fold increase. The gas reserves have increased from a meagre 78 billion cubic metres (as on January 1, 1975) to 831 billion cubic metres (as on January 1 last). Twenty-four new discoveries have been made in western offshore since 1980, comprising 13 oil, five oil and gas and six gas discoveries.

Bombay High was the first major success. Production from Bombay High was started in May 1976 through one platform and daily rate of 4300 barrels of oil. By September 1987, this production has been gradually raised to around 430,000 barrels of oil per day.

The development of Bombay High has been done in a phased manner. Till now, four major process platform complexes have been installed and commissioned in Bombay High field apart from two water injection process platforms.

There has been several-fold acceleration in offshore operations since the beginning of the Sixth Plan, and a further two-fold acceleration of activities is contemplated during the Seventh Plan as compared to the Sixth Plan. As against seven rigs deployed in offshore during 1980-81, 21 rigs comprising eight owned and 13 charter hired are in operation.

Apart from Bombay High, three other western offshore oil fields — Heera, Ratna and Panna — have been contributing to its total output. Production from Ratna field, south of Bombay High, commenced in November, 1982. Heera field was put on production in March 1984 and production from Panna field started in December 1986.

A significant development in Panna field is the use of the first early production system. The production platform in Panna field is connected to the mobile jack-up process platform — Sagar Lakshmi. The oil from the installation is being transported through SBM and tanker to the Uran terminal. The concept of floating early production system is being extended to other isolated fields in western offshore.

Some of the major fields under development or planned for development are Tapti, D-18, D-1, D-11, B-57, B-131, 132 and 134 and South Bassein B-178, 179. The first phase of South Bassein field development has already been completed. Efforts are on to recover oil from the thin rim of South Bassein using horizontal drilling technology. The Tapti field comprising three structures — north, south and mid-Tapti — is mainly a gas field. ONGC has submitted proposals for investment decision for the development of Tapti field.

These measures have enabled ONGC to plan for an increment of about 2.3 million tonnes of crude production in the next two years and the possibility of further accelerating the output in the subsequent plans.

During the last few years, ONGC has taken several initiatives by introducing new innovations, technologies and modernisation measures to meet the accelerated programme of offshore development. In addition, a deliberate strategy of reducing cost of operations through management and technical audit studies has been adopted.

The successful application of horizontal drilling technology and sub-sea completion in Bombay High field, the press note says, has reinforced ONGC's confidence in meeting the growing petroleum demand through indigenous efforts by harnessing the hydrocarbon potential.

The prospects of Bombay High area have further improved with the encouraging results of basement oil exploration and extension of western oil belt off Bombay High. A large number of new finds are also proposed to be put on early production through the floating production system.

HC SUSPENDS JUTE PACKING ORDER

The Andhra Pradesh High Court has passed interim orders suspending the operation of the mandatory jute packing materials order dated May 29, 1987 throughout the country.

Mr. Justice Upendralal Waghray while issuing the above suspension orders directed that in view of the importance of the matter the main petition be posted for further hearing on November 2, before a bench.

Mr. Y. Ratnakar, counsel for the petitioners consisting of a consumer association, cement industry and HDPE woven sack units, challenged both the Act and the order being violative of the relevant Articles of the Constitution.

The court weighed the balance of convenience and passed the suspension orders on the jute packing order as it has the effect of closing HDPE units in the country.

The judge also observed that material had been withheld from his scrutiny as the Union Government claimed privilege and refused to produce the details of the grounds on which the standing committee on the mandatory order made percentages of reservations for jute and HDPE bag packing.

The judge took note of the fact that events preceding the passing of the respective order were in such quick succession that the standing committee could not have had occasion to consider relevant material before arriving at the reservation percentages.

ONGC takes up 9 EOR pilot projects

n keeping with the current world
nd to recover maximum oil by ado-
ng enhanced oil recovery (EOR)
chniques, ONGC has taken up nine
R pilot projects to maximise reco-
y from existing producing fields.

Eight of these projects are in Gu-
at and one in Assam. The Gujarat
ojects are located in Sanand, Jhal-
a, Kalol, Ankleshwar, Balol and La-
a and the Assam project in Geleki.
nce Balol and Lanwa projects are
heavy gas fields in north Gujarat,
recovery techniques there will pre-
ppose heating up for reducing the
scosity. The successful completion
these projects is expected to yield
additional 40 million tonnes of re-
verable reserves.

EOR techniques form part of the
assive modernisation plan, ONGC
s embarked upon in its desperate
d to achieve the production target
32.3 million tonnes including 22.2
illion tonnes from offshore operation
d 10.1 million tonnes from onshore
the terminal year of the Seventh
an. Cumulatively, the Seventh Plan's
oduction target figure has been set
144 million tonnes against the ac-
al 90 million tonnes in the Sixth
an. At present, ONGC's production
stagnating around 27-28 million
nnes annually. In other words,
NGC has to produce an additional
e million tonnes annually to achieve
e Seventh Plan target.

How stupendous is the job can be
nderstood from the nature of moder-
sation scheme underway. The
cheme includes the introduction of
FS VII units, field processing sys-
m, personal computers, satellite and
DM system for surveys, telemetry
ystems vibrators and air guns for
SP operations in the field and the
chniques being applied are close
rld 2D surveys on producing structu-
s, 3D surveys onland and offshore
r reservior delineation, multiple off-
et VSP in all drilled wells and vibro-
s surveys in basin marginal areas
f difficult terrain.

With a view to making an early
ssessment of reservoir potential in
ddition to generating revenue through
rude production, ONGC has adopted
strategy of putting its newly dis-
vered fields on early production system. In the last three years, 15 such onshore and one offshore discoveries have been put on production.

Under the modernisation programme, drilling, the most crucial of all operations relating to hydrocarbon exploration, is being given due attention. The induction of mobile drilling rigs and special rigs particularly for exploration in desert areas is to add to the overall operational efficiency. In the eastern region, heli rigs are being installed at drill sites unapproachable by roads. Computer-aided drilling has been introduced to take quick decision in solving problems encountered during the operation. Another significant achievement has been the horizontal drilling required for producing oil from very thin columns identified in the south bassein gas field.

With the introduction of multiple completion technology, as many as three different layers are being made to flow through a single tubing thus boosting production. The method also helps cut down costs and better sweep efficiency aimed at a higher ultimate recovery.

In offshore operation the most significant has been the introduction of subsea completion system. The system, introduced for the first time in Bombay High, is expected to cover Krishna-Godavari basin also where oil has been found in considerable water depth. The government has sanctioned about Rs. 21 crores for introducing this technology as an R and D project.

In the current year, ONGC also proposes to launch a deliberate deep water and continental slope exploration programme to be continued till 1989-91 in various phases. The discovery of basement oil in Bombay High has been yet another major development in offshore operation. The discovery, it is felt, might extend the field life of Bombay High.

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Development of new energy sources vital

The Union Petroleum Minister, Mr. Brahm Dutt, said on Sept. 24 that energy-mix in future would shift from oil to coal and then to renewable sources of energy and the country did not have more than 35 to 50 years for this overall transition.

The Minister, who was inaugurating the second workshop on coal gasification organised by the Oil and Natural Gas Commission (ONGC) said that even though self-reliance in oil grew from 34 per cent in 1980-81 to 70 per cent in 1985-86, the depletion of domestic resources indicated that the future lay in the development of alternative sources.

Science, the Minister said, was already focussing attention on harnessing ample and renewable resources like Sun, wind and tides besides non-renewable but unconventional resources like underground coal gasification.

The Oil and Natural Gas Commission, the Minister said, had discovered in North Gujarat about 63 billion tonnes of coal buried up to 1700 metres deep and the Government had constituted a national committee of experts to oversee the commission's project of gasifying this coal underground.

Mr. Brahm Dutt said that the commission was looking for development of new technologies which could help exploit unconventional energy sources efficiently and economically.

The in-situ coal gasfication at such a great depth was a challenge which had to be met because coal gasification provided a viable route for conversion of solid coal to range of products which could serve markets traditionally reserved for petroleum and gas.

The Minister said that low quality gas could be used directly for industrial heating or power generation. Medium quality gases might serve as a source of synthesis gas, for indirect liquification to provide transportation fuels like methanol, gasoline and diesel

The Minister said that the problem of energy was a matter of global concern World-wide inflation, retarded growth of industrial economies and deteriorating economies of inefficient oil producing countries were all linked to energy problems

This made synergical development of new and non-conventional sources even more compelling and called for international co-operation for establishing appropriate technology for exploitation of coal reserves buried deep.

Earlier, welcoming Indian and foreign delegates participating in the workshop, the ONGC Chairman, Col. S.P. Wahi, said that while oil and gas would continue to play a major role in the foreseeable future, it was necessary to work out the total energy needs for the next 20 to 25 years to be able to plan development of other energy sources.

Col. Wahi said, top priority should be given to preparing a national integrated energy plan and in the meanwhile, more effective measures should be taken to ensure conservation and efficient use of energy, particularly petroleum products.

Referring to the tremendous possibilities natural gas offered as a substitute for oil and petroleum products in various industrial sectors like fertilisers and power generation, the ONGC Chairman said that effective management of natural gas could save Rs. 2000 crores in foreign exchange in 1990-91.

NEW PUBLICATION ON PLASTICS

'MAHARASHTRA' Plastic Extrusionist Association has planned to come out with a prestigious publication titled "Plastic Age of Maharashtra" very shortly.

The issue will cover entries of all plastic industries of maharashtra including their addresses, annual turnover, items manufactured, representatives' names etc. and will be a ready reckoner useful to all plastic industries.

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All entries included in the book will be free of charge. Advertisers are requested to contact for their insertions. Each insertion will fetch handsome return to advertisers year after year. For further details please contact: Mr. Vijay Nahar, (President) — MAHARASHTRA Plastic Extrusionist Association, 589, Ganesh Peth, Dhor Galli, Pune-411 002.

PLAN FOR N-ENERGY TIE-UP OUTLINED

The Atomic Energy Commission chairman, Dr. M. R. Srinivasan, has urged that an outline be drawn up for a multinational effort to promote nuclear power in developing countries.

Speaking at a scientific session of the International Atomic Energy Commission at Vienna, Dr. Srinivasan said India would be happy to share its experiences in the peaceful uses of nuclear energy with other developing countries.

His lecture on nuclear power in developing countries, notes that as a country with the constraints of limited fossil resources and a large population, India expected nuclear power to play an increasingly important role.

Dr. Srinivasan said it was fortuitous that energy demand in the developed countries was generally tapering off which could result in significant surplus capacities for the manufacture of nuclear power equipment.

MODVAT SCHEME FOR SMALL UNITS EXTENDED

MODVAT scheme for the small scale industries which was to be withdrawn from October 1, 1987 has been extended up to October 31, 1987, according to an official press release.

Under the MODVAT scheme, duty paid on inputs is available as credit for payment of duty on the final products. Generally the extent of credit is equal to the duty actually paid on the inputs

However, in respect of inputs manufactured by small scale units under the general small scale exemption scheme, the industry can take full credit of duty leviable on the inputs even though the small scale units have paid duty at the

ONGC gears up to tap Cochin high

Oil and Natural Gas Commission NGC) is to commence drilling on e Cochin High structure in Kerala fshore from October next. The Kon- n-Kerala-Lakshadweep basin occu- es the vast offshore areas off the ast of Konkan, Kerala and Lakshad- eep, in the Western Coast of India. eographically, the Konkan-Kerala elf covers an area of about 77,000 . km.

The prognosticated geological re- ources in the Kerala-Konkan shelf ea have been estimated at 300 mil- on tonnes oil and oil equivalent of s.

Preliminary and reconnaitory seis- ic surveys in Konkan-Kerala shelf eas were initiated by a Soviet ship collaboration with ONGC in 1965. ith the discovery of Bombay High il field in 1974 and several subs- uent discoveries of oil and gas fields the Bombay offshore area prompted NGC to restart seismic surveys in e shelf areas alongwith the Konkan nd Kerala coast in 1977. The inter- retation of this seismic data has re- ulted in the identification of several tructural indications in the Konkan- erala area.

Besides Bombay offshore, drilling y ONGC is presently going on in est Bengal, Krishna-Godavari, Cau- ery and Andamans offshore. The of- hore reserves as on January 1 last e estimated to be of the order of 0129 million tonnes. Out of this 740 million tonnes belong to area ther than Bombay offshore.

In the West Coast itself, out of 176 rospects only 81 have so far been sted. Bombay High. Heera, Ratna nd Panna fields in the West Coast e contributing towards the total off- hore production. Since 1980, 23 oil nd gas discoveries have been made the West Coast alone, and efforts e being made to crash their lead me for their development through ating production systems.

There has been several fold accele- tion in offshore operations since the ginning of the Sixth Plan, and a fur- er two-fold acceleration of activities contemplated during the Seventh lans compared to the Sixth Plan. As ainst seven rigs deployed in offshore uring 1980-81, 21 rigs comprising eight owned and 13 charter hired are in operation.

Depending upon the geological and logistic requirements, exploration companies, the world over, generally prefer to have a certain amount of flexibility with regard to rig deployment. Therefore the approach adopted by ONGC has been to operate a fleet of rigs comprising jack ups, semi-submersibles — drill-barge and drillship, etc. as also to hire the various type of rigs depending upon the requirement.

A target of drilling 256,040 meters has been fixed through drilling of 107 wells (34 exploratory and 73 developmental) during 1987-88. The drilling targets for the first two years of the 7th Plan have already been over achieved in terms of number of wells and meterage.

Out of eight owned rigs operating presently, five are being managed by ONGC and the remaining three rigs through management services. Phase-wise plan of taking over management of the rigs has already been drawn with a view to supplement ONGC's efforts in offshore drilling and to develop indigenous capacity and capability contract drilling by Indian companies through joint venture arrangement with reputed international companies is being encouraged.

PLAN TO SET UP OIL REFINERY IN THANJAVUR

The Centre is examining the possibility of setting up a full fledged oil refinery in Thanjavur district, according to the State Industries Minister, Mr. K. Rajaram.

He said during his recent visit to the district that the preliminary studies were being carried for commercial exploitation of natural gas reserves in the Cauvery basin in Kovilkallapal in Thanjavur.

The studies are being jointly carried out by the Oil and Natural Gas Commission (ONGC) and the State Industries Department.

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Gleanings from the press

FERTILISER FREIGHT ABOLITION : HARDLY THE TIME

The reported move to abolish the freight pool for, and freight subsidy on fertilisers has certain implications which the government would no doubt want to study before taking a final decision. In the first place, it must be made clear that the abolition of the freight subsidy per se does not require giving up the freight pool. A pool can operate as it does, say in the case of cement, without a government subsidy. The consumers collectively bear the freight — equally per unit consumed — those nearer the supply source subsidising those farther away. Considering the substantial saving in government expenditure, which the abolition of the subsidy implies, it would be a welcome measure. But the implication clearly is that the retail prices of fertilisers will go up. No tears need be shed on this score either. The question of timing, however, remains. Should it be done in a year like the current one, when drought stalks the country and all hopes are pinned on the rabi season to make up for the ground lost during the kharif? There is enough fat in government expenditures which can be trimmed without having to touch the fertiliser subsidy at this time.

The abolition of the fertiliser pool, with consequent freedom of purchase from any source one likes, may again be a desirable long-term reform, but time is hardly opportune for it now. There are two objections to freight pooling generally. One, it distorts the location of industry; two, it can result in a waste of the scarce resource of transport by cross movements, to prevent which it becomes necessary to demarcate the marketing areas for different plants. The first objection hardly applies in the case of fertiliser since location of plants is decided, by and large, by the government. And to the extent distribution is regulated, the waste of transport is also minimised.

The government's move seems to be based on the assumption that the fertiliser glut has made the freight subsidy irrelevant and the existing distribution mechanism has become redundant. This is nothing but muddled thinking, as the glut and the fertiliser pricing mechanism are unrelated and have little to do with each other. It cannot be ignored that the glut is the product of badly planned imports by the government and does not reflect the underlying domestic demand/supply gap in fertiliser. Whatever be the merit of reform from a long-term point of view, the country can ill afford a market disruption at present in the case of fertilisers, which will no doubt occur, if the freight pool is given up now. We cannot afford to have varying prices of fertilisers, depending on the distance from the manufacturing plants, when procurement prices of foodgrains are fixed on a uniform basis across the country. The pricing system for fertiliser seems to have served the industry and the consumer reasonably well. True, it has not served the government well, since it has to bear the burden of massive subsidies. But now is scarcely the time to pass on increased burdens to the consumers of fertilisers.

Even if this view is accepted, however, the government cannot delay such revision in the retention price formula which it may want to bring about, since uncertainty on this score is causing prospective investors to hold back. It should not be difficult, however, to separate this exercise from the question of freight pool or marketing arrangements. Retail prices should not be raised at least till the rabi season is over.

— **The Economic Times**

HALDIA PETROCHEMICALS

If IDBI took an unusually long time to give its seal of approval to the Haldia petrochemicals project, it was because there was a question whether a plant with a capacity to crack 1.30 lakh tonnes of naphtha (which is the approved size) could be viable. The Union government's stand has always been that a plant should have a minimum naphtha cracking capacity of 2.5 lakh tonnes to be viable. The expert committee constituted by IDBI to review the project thought that while a larger size would certainly be desirable, what would ensure the viability of Haldia petrochemicals was not its size but the fact that it would have an assured market for its products within the country. As a practical proposition, this is correct. But the plant will not have the benefit of economies of scale, even though at a subsequent stage, the capacity of the project can be increased by 25 per cent. Protecting a project from international competition is certainly not the best way of ensuring its long-term viability.

Be that as it may, the petrochemicals project means a lot for the industrial revival of West Bengal. This explains why the Left Front Government was desperately searching for a private sector partner when New Delhi pleaded its inability to participate in the project on grounds of funds shortage. Since the signing of the agreement between the West Bengal Industrial Development Corporation and the R. P. Goenka group in May, 1985, the cost of the project has more than doubled to Rs. 1,452 crores. Besides the normal inflation factor, what has contributed to the sharp escalation in the project cost is the appreciation of major currencies and the increase in duty on project imports from 55 per cent to 85 per cent in the 1987-88 budget. The promoters will have to seriously address themselves to the task of completing the project within the scheduled period of 36 months so that there is no further cost escalation. They will need the support of state agencies to keep to the time schedule. The project designed to manufacture polypropylene, HDPE, styrene, butadiene and ethylene glycol should lead to the creation of a whole host of downsteram units.

But the infrastructure in Haldia is presently not strong enough to accept the kind of investment the petrochemicals project and its downstream units entail. This weakness has to be rectified as quickly as possible. The capital intensive petrochemicals project is not going to create many jobs, but the downstream units will create plenty of employment opportunities. Its success will no doubt inspire many entrepreneurs to set up new industries in West Bengal.

— **The Economic Times**

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SPOTLIGHT ON
biotechnology & life sciences (part 1)

JAPANESE COMPANIES OFFERED BIOTECH LOANS AS A SPECIAL INCENTIVE

The Japanese financing system which was set up to accelerate the commercialisation of biotechnology products can award loans to cover up to 40% of the cost of facilities and equipment needed for the production of genetically-engineered pharmaceuticals. The loans are given at an interest rate of 6.1% per year and are designed both to encourage the Japanese biotechnology industry and to assist companies in meeting the requirements laid down in the manufacturing guidelines introduced at the beginning of this year. (*Script*, No. 1215 p. 19).

HUMAN GENOME SEQUENCING PROJECT MOOTED IN U.S.A.

The seed of an ambitious project has sprouted at the Dept. of Energy (DOE) in U.S.A. A departmental advisory committee has recomended the DOE lead an effort to develop technologies for determining the sequence of the three billion chemical bases in human DNA that spell human beings. Success would potentially put human intelligence in control of the genetic destiny of the species.

If it is approved by DOE and funded by the US Congress, sequencing the genome would certainly be biology's biggest undertaking in the 20th century. New diagnostic tests and perhaps therapies for genetic diseases would be among the early practical benefits. On the other hand, a sequencing project would require years of work by thousands of scientists and would cost hundreds of millions of dollars.

Sequencing would first require the construction of a rough "physical map of the genome. The DOE is already committed to this stage of the project, for which technology is available. For example, new techniques for handling large pieces of DNA have been developed in recent years. Researchers at Columbia University have already demonstrated the methods; usefulness by constructing a complete map of the 4.7 miloin-base genome of *E.coli.*

With conventional techniques the cost of annually sequencing the human genome, at about $ 1 per base, would be a problem -- a $3 billion problem, in fact. But Leroy E Hood of the California Institute of Technology, who has pioneered the development of automated sequencing equipment, believes advances in robotics will lower costs to one cent or less per base pair within a few years. Already, the Japanese have made advances and there are hopes that sequencing could be coordinated internationally. At present, it would take perhaps 30,000 technician years to do the job. Researchers say that if the cost came down to $300 million, one could plan to do the job over a period of 10 years.

David Baltimore, a Nobel Laureate and the director of the Whitehead Institute for Biomedical Research at the Massachusetts Institute of Technology, wrote recently in "Issues of Science & Technology" that a 'megaproject' such as the sequencing of the human genome will increase political control over science. The US Congress has dubbed the megaproject as the "human Genome Initiative" and significant support for this project is gaining grounds. (*Scientific American*, 5/1987, p. 50D).

A JOINT-EFFORT TO BIOENGINEER A NOVEL VEGETABLE OIL

Genetic engineering of what is described as a novel specialty vegetable oil is the aim of a long-range product development agreement between Calgene (Davis, California) and Nippon Steel. But because of the increasing competitive nature of biotech ventures, neither will disclose the target crop or potential uses of the oil.

Under the agreement, Nippon Steel will have exclusive product distribution rights in the Pacific Basin, while Calgene will retain exclusive North American production and marketing rights. The agreement closely follows Calgene's successful demonstration of seed-specific gene expression in rapeseed, a plant that produces an oil used in steel heat treatment.(*Chem. Wk.* 4/29/87 p. 32).

THE US PATNET OFFICE ISSUES PATENT TO MAN-MADE LIVING OYSTER

The April 3rd ruling by the US patent Office Board of Patent Appeals & Interferences has officially declared that the man-made oysters are patentable. It has officially announced that it 'now considers non-naturally occuring non-human multi-cellular living organisms, including animals to be patentable subject matter'. But says Commissioner of Patents and Trademarks, Donald J. Quigg, 'an article of manufacture or composition of matter occurring in nature will not be considered patentable unless given a new form, quality, properties or combination not present in the original article existing in nature in accordance with existing law'. *hem. Wk.* 4/29/87 p. 32).

MBIOSIS IN THE DEEP SEA ETWEEN INVERTEBRATE IMALS & SULFIDE OXIDIZING ACTERIA UNVEILED

Recently researchers in marine ology have invented a unique mbiosis between invertebrate imals and sulfide-oxidizing bacria that colonize their cells. Until cently the deep sea was consided to be a desert, where the low undance of organisms stems from e extreme limitation of the food pply. Recent, marine research in e deep-sea has revealed that there one habitat in the deep sea where e density of life equals, if it does ot surpass, what is found in any her marine ecosystem. It is the ystem of hydrothermal vents or eep sea hot springs, situated at sea oor spreading centres.

It was at the spreading ridge in the acific Ocean, 320 km north-east of e Galapagos Islands, that Geolosts on the research submarine lvin in 1977 discovered an oasis of ensely packed animal life 2,600 etres below the surface. Here ere species previously unknown to cience, living in total darkness in ensities enormously higher than ad ever been thought possible in e deep sea. Giant tube worms as uch as one metre long, large white ams 30 cms in length and clusters mussels formed thick aggregaons around the hydrothermal vents. here were smaller but but nonethess significant numbers of shrimps, abs and fishes.

Scientists have now evolved a ear explanation for this teeming asis of life at the bottom of the cean. Water samples taken from e vent sites and analyzed by searchers indicated that these nderwater hot springs, like many hot springs on land, are rich in hydrogen sulfide. This energy-rich but highly toxic compound is found at high levels in the water that flows from cracks in the ocean floor. For years biologists had known that sulfide-rich habitats, such as terrestial hot springs, support large numbers of free-living bacteria. Like green plants they are autotrophs, but they got energy fro carbon fixation -- the conversion of carbon dioxide into organic molecules that serve as nutrients -- not from the own but from the oxidation of hydrogen sulfide. These autotrophic bacteria depend on hydrogen sulfide and other reduced forms of sulfur for their metabolic activities. These sulfide oxidizing bacteria form the base on the bent food chain by providing food for the animal species.

Although they are very distantly related, green plants and sulfur bacteria are functionally similar in an important way: both are primary producers. Whereas green plants photoautotrophs, sulfur-oxidizing bacteria capable of using an inorganic energy source to drive carbon dioxide fixation are called Chemolithoautotrophs. They are literally consumers of inorganic -- without an external source of reduced carbon dioxide through a series of biochemical reactions collectively known as the Calvin cycle. The Calvin cycle functions in much the same way for bacteria as it does for green plants, the end products for both is reduced carbon.

The discovery of life at deep sea vents have stimulated studies of a wide range of sulfide-rich environments, including mangrove swamps, petroleum seeps, sewage outfall zones and marshes. These studies have revealed that the kinds of sulfur-based symbiosis first discovered in the deep sea are widespread, and that various other energy-rich inorganic molecules, such as methane, can be exploited in analoguous symbiosis between other invertebrates and bacteria. (*Scientific American*, 5/1987 pp 107-112).

A NEW TEST KIT TO DETECT TURF GRASS FUNGAL DISEASES

Agri-Diagnostics Associates, the joint venture between DNA Plant Technology and Koppers has started marketing its monoclonal antibody test kits for turf grass fungal detection in USA. The kits allow for same day on-site detection of pythium, blight dollar spot or brown patch, three highly destructive fungal diseases, before visible symptoms appear.

Initially, the joint venture is targeting 900 golf courses -- about 8% of the national golf market and plans to increase this later in the year.

Agri-Diagnostics is also conducting extensive field trials of a kit for the detection of a major fungal disease affecting several commercially important crops. This programme is proceeding under the terms of a R & D product development agreement with Ciba-Geigy. (*ECN*, 6/8/87 p. 15).

LINEAR PLASMIDS ISOLATED TO TRANSPORT GENES FROM ONE MICROORGANISM TO ANOTHER

Linear plasmids -- possible new vehicles for transporting genes from one microorganism to another --have been discovered in four strains of yeast, reports Paul L. Bolen, a geneticist at the Department of Agricultural Research Centre at Peoria, Illinois, USA.

Until now, linear plasmids have been found in only one other yeast. The linear plasmids may work better

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than the circular ones that are now used to shuttle genes between microorganisms, reports Bolen, 'in part because they reproduce and float freely within the yeast cell's inner space or cytoplasm'. In contrast, the circular plasmids are surrounded by membranes that 'are obstalces to getting DNA out of a cell or putting DNA in'. Bolen and his colleagues identified linear plasmids in three strains of Saccharomycopis (Crataegensis) and in one strain of Pichia inositovora. In 1981, Japanese researchers found the first linear plasmids in the yeast Kluyveromyces lactis, which ferments lactose to lactic acid.(*Chem. Wk.* 7/8/87 p. 16).

CONTROLLED ATMOSPHERE FOOD PACKAGING ON THE HORIZON

A new line of oxygen-nitrogen-carbon dioxide gas blends has been introduced by Air Products & Chemicals (Allentonis, Pa) for use in a process known as 'Controlled Atmosphere Packaging (CAP)'. The gas blends, trade marked 'Freshpak', are intended to replace air as the atmosphere in packaging food products. The blends are said to inhibit bacterial growth, lengthen shelf-life and preserve the natural red colour of meat. Air products currently is supplying Freshpak blends to John Morrell Co. (Sioux City, Iowa) which will use them initially to package pork products. (*Chem. Wk.* 7/8/87 p. 16).

A PROBE-BASED ADVANCED DIAGNOSTIC TEST FOR AIDS VIRUS MOOTED

Gene-Trek Systems (Framingham, Mass.), a joint venture of Integrated Genetics and Amoco, plans to commercialize an advanced diagnostic test for the direct detection of the AIDS virus in patient blood samples.

The new test is a nucleic-acid-probe-based assay that indicates the level of activity of the virus in the blood at a given time. Probe-based assays are an alternative to currently used immunological assays, which are designed to detect antigens of, and antibodies to, the AIDS virus, rather than the genes themselves. Because of their sensitivity and specificity, probe tests can be used for early detection of the AIDS virus and for distinguishing between strains and variants of the virus. (*Chem. Wk.* 7/8/87 p.16).

A BIOTECH PROCESS FOR GOLD RECOVERY UNDER TRYOUT

A biotech process for gold ores recovers well in excess of 90% of the available noble metal in its first tryout. The process has been developed by Giant Bay Resources Ltd. (Burneby, British Columbia, Canada).

The 10 ton/day demonstration plant installed at Giant Yellowknife Mines Ltd's Salmita Mills in Canada's North-west territories under a joint-venture of the two companies, has processed 500 tones of ore in a 2 months test that ended last June 1987.

Giant Bay's process uses Thiobacillus ferro-oxidans bacteria to break down sulfides in refractory ore and make it amenable to conventional cyanide leaching. Giant Yellowknife could get only 60-65% gold recovery with the Cyanide process alone. The demonstration proves that the biotech process does work on a large scale, reports Giant Bay's president Claus Jensen. The economics looks very favourable and the company is negotiating with a number of companies to commercialize the process.
(*Chem. Eng.* 7/20/87 page 9 and 10).

SMALL IS BEAUTIFUL WITH THUMPING SUCCESS IN BIOTECHNOLOGY

In Britain, small is beautiful with viable success in the new high-tech field of biotechnology. Two British biotech companies have show the way.Britain's leading company pre-eminent in biotechnology is Celltech, based in Slough, West of London, with less than 200 employees. It owes its position to manufacture of monoclonal antibodies -- those able to recognize and bind with specific molecules that give different cells an individual character. Monoclonal antibodies are in demand around the wrld for research into drug targeting. For example, a new ingenious 1,000 litre fermenter developed recently at Celltech's plant has increased the firm's ability to produce large quantities of such antibodies to customer's specifications, giving it the edge in the commercial production.

Imperial Biotechnology is another small scale biotech venture spawned by Britain's largest venture capital outfit -- called 3i Ventura. 3i Ventura was called in by Imperial College (part of the University of London) to find a commercial role to its biotechnology biochemist looking for a means of setting up a business -- and Imperial Biotechnology was born. This venture, by concentrating on a narrow field -- identifying the enzymes involved in breaking down proteins to form taste products -- the new company soon built up unparalled expertise. Its latest product is to be an enzyme which will have the time needed for Cheddar cheese to mature. The Company leases the biotech unit from the college, but has its own offices elsewhere. By this arrangement the college's revenue is increased and Imperial Biotechnology has access to equipment it could not otherwise afford. (*British Ind. News*, May/June 87, pp21-22).

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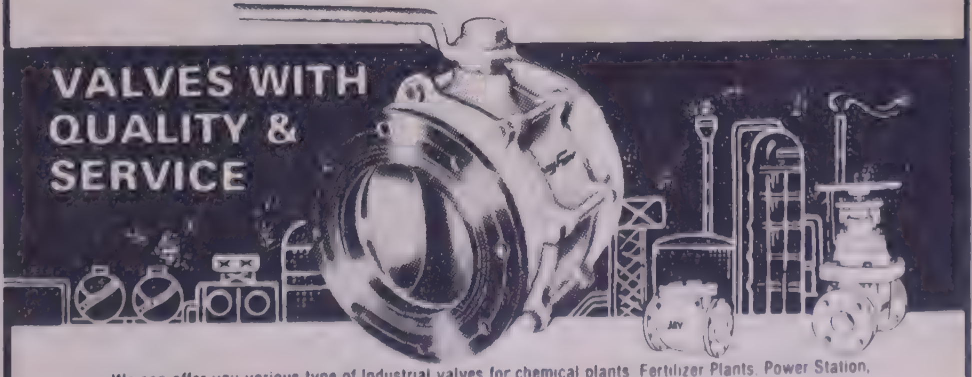

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ERSATILE AERATION SYSTEM

The Electricity Council Research entre (ECRC), in conjunction with e Welsh Water Authority, has eveloped a new aeration process hich, besides offering a reduction the costs of treating sludges in wage works, has proved to have dustrial uses in aeration and ixing.

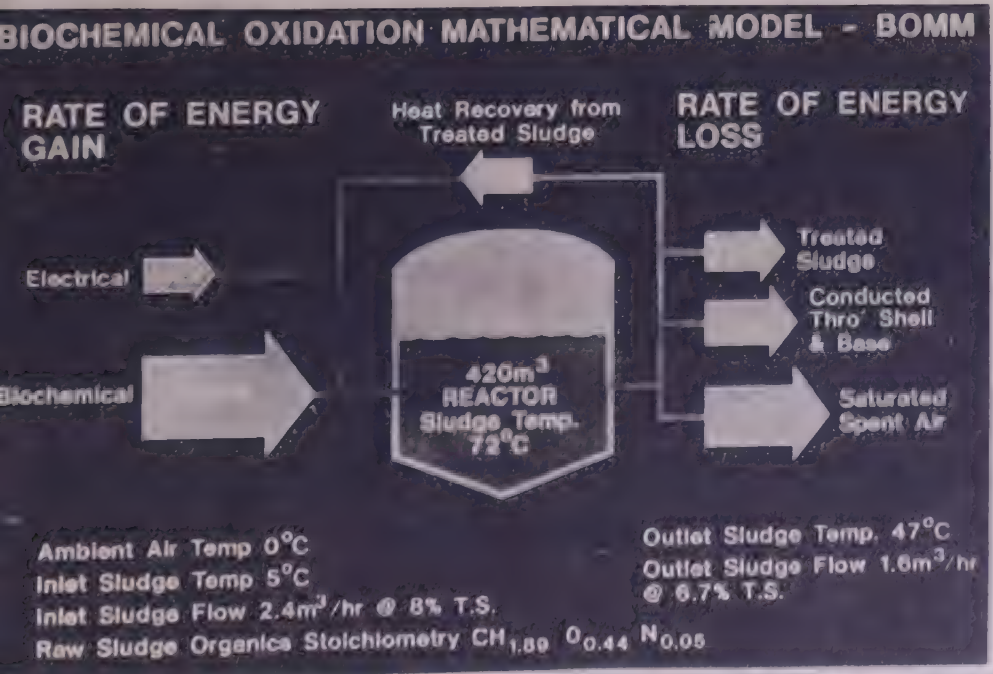
Known as the Maguire VO_2 stem and licensed to Tom Maguire company, it comprises essentially venturi and a pump. A versatile stem, it is claimed to be capable increasing air input to a sludge ed by more than 30% in some ases from a very small volume. A ngle VO_2 aerator can dissolve up 80 kg/h of oxygen at a cost of less an 2 pence/kg in Britain. An excel-nt mixer, it can be fitted to existing nks.

Much of the development work as been done at Ponthir Sewage orks, near Newport, in Wales. A thermophilic process is created, which at temperatures of 55 to 65°C reduces the incidence of pathogenic species.

Heat Conserved

There is evidence that almost total destruction of E. coli and Salmonella occurs. Solids are reduced by 40% and chemical oxygen demand by 50%. A feature of use in biological systems is that the heat released biochemically is not dissipated but conserved in the system. Hence temperatures of over 60°C can be maintained in open tanks.

The Maguire VO_2 system is finding application in diverse industrial situations, in aeration and effluent treatment. It is also thought likely to penetrate the aeration market in production biochemistry. Uses already include the aeration of sulphuric acid and the oxidation of sulphite wastes by chemical manufacturers, the treatment of effluents from breweries and paper reprocessing plant, aerobic digestion of high strength chemical waste, and effluent applications in the food industry.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Outlet Sludge Temp. 47°C
Outlet Sludge Flow 1.6m³/hr @ 6.7% T.S.

iochemical oxidation mathematical model of energy balance, based on development work at Ponthir Sewage Works, near Newport, Wales.

An example is the purpose built high rate aeration tank installed by Cadbury at Marlbrook, in Western England. This plant produces chocolate crumb, a mixture of milk, sugar and cocoa mass which forms the basic raw material for manufacturing Cadbury's chocolates.

Cadbury had been using a 300m³ capacity concrete tank with a fine bubble diffusion effluent treatment system, followed by treatment on a roughing percolating filter and an alternating double filtration system before discharge to river. A 547m³ tank fitted with a Maguire VO_2 aeration system was added to meet increased demand, installed in parallel with the fine bubble diffusion tank, so that the effluent could go to either or to both, either in series or parallel. Only months after installation, Cadbury was routing its entire effluent output through the VO_2 system.

Although designed originally as a roughing process, the system has often achieved biological oxygen demand (BOD) removal figures of 95%. At a BOD reduction of 1.9 kg per kWh, the system has proved to be up to 20% more efficient than its anticipated performance, and even through the winter was still raising effluent temperature by 2° to 4°C.

For further details contact: Tom Maguire & Company Ltd., Honeyborough, Neyland, Milford Haven, Dyfed, Wales, SA73 1SE.

PRECISION THERMOSTATIC BATHS

Grant Instruments (Cambridge)

Ltd. has introduced the first products in its new Barrington comprehensive range of laboratory equipment. The first products are precision thermostatic baths, circulators, coolers and immersion thermostats. The range includes a new series of low cost baths with digital setting and display and a powerful temperature circulator, the LTD6.

Important features of the range are modern design and the application of microelectronics. There are four sizes of tank in the Barrington range of baths: 38, 28, 14 and 6 litres, with a choice of digital or analog control units, both covering the range of 0 to 150°C.

Both units are fittd with a new electronic temperature control system which uses Pt 1000 temperature sensors and provides very good long term stability. Pumps for external circulation are fitted as standard.

The practical, modern design includes controls that are recessed and can easily be detached for cleaning or servicing, and straightforward instructions printed clearly on the side of the baths. There is also a wide range of accessories.

Dual Function

The Barrington LTD6 low temperature circulator has a range from -20 to 100°C. Principally intended for pumping temperature controlled liquid around other equipment, it can also be used as a small thermostatic bath. The temperature is set, as with all digital units in the range, simply by pushing in a knob and turning until the correct value appears on the liquid crystal display. At other times the display shows the actual liquid temperature.

The three immersion thermostats in the range enable almost any tank to be used as a thermostatic bath or a pumped source of temperature controlled liquid. A choice of digital, analog or mechanical models covers ranges from -30° to 150°C.

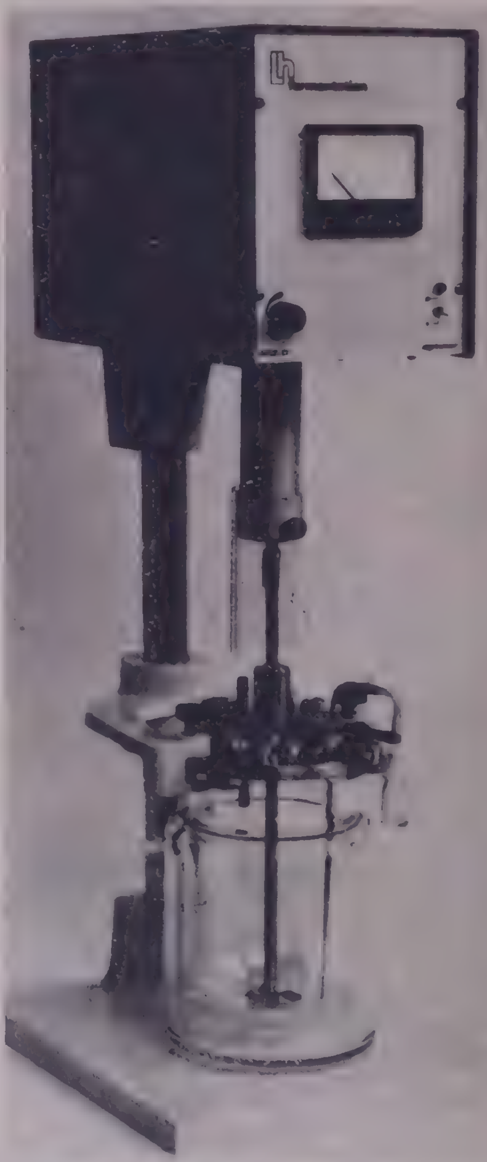
The immersion coolers can replace solid CO_2 or liquid nitrogen in appropriate applications, and can also be used as accessory coolers for thermostatic baths. In conjunction with Barrington Immersion Thermostats or a similar controller, they enable any well insulated tank to be converted to a low temperature thermostatic bath.

For further details contact: Grant Instruments (Cambridge) Ltd., Barrington, Cambridge, England, CB2 5QZ.

The Barrington range of precision thermostatic baths from Grant Instruments (Cambridge) Ltd. comprises tanks of 6, 14, 28, and 38 litre capacity, with a choice of digital or analog control units.

BIOREACTORS FOR SHEAR SENSITIVE CELLS

LH Fermentation Ltd. has added to its range of cell culture bioreactors a series of direct drive systems for the cultivation of shear sensitive cells. These bioreactors incorporate a slow speed motor, marine impellers (0 to 250 rev/min) and dome based culture vessels.



The 502D slow direct drive stirrer from LH Fermentation

The 500 Series of direct drive culture vessels utilises a standard 152 mm stainless steel top plate and glassware with a hemispherical base. The vessels can be supplied vith either a single skin or a jacket o provide temperature control via a circulator. The shafts have been slightly extended to accommodate marine type impellers for low shear mixing.

With total volumes of 1.3 and 2.3 itres, the systems are provided with a flat bottomed jacket which allows the vessels to stand unaided on a bench top. All the normal parameters can be measured within these vessels, which can be coupled to the 500 Series modular control systems.

A similar series of vessels is available with a magnetic drive system and an agitator shaft fitted with paddles to give low shear mixing.

Flexible control system in the 500 Series enable the user to choose from a range of modules for controlling parameters such as pH, temperature, dissolved gases, gas flow rates and so on.

For further details contact: LH Fermentation Ltd., Bells Hill, Stoke Poges, Slough, Berkshire, England, SL2 4EG.

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Druck Ltd. has introduced a digital pressure controller with the ability to measure, indicate and control pressure in any range of specified units (pascals, lbf/in², millimetres of water gauge and mm Hg being standard) providing a full scale of 19999 and an accuracy of 0.04% full scale for ranges up to 3.5 MPa gauge. All ranges of the DPI 500 have a combined non-linearity, hysteresis and repeatability figure, typically of <+0.04% full scale.

Ergonomically and aesthetically designed, the DPI 500 converts the transducer signal into a 4 1/2 digit liquid crystal display (LCD) with a resolution of 0.005%. In addition to the digital readout, the instrument offers both analog binary coded decimal (BCD) and Institution of Electrical and Electronic Engineers (IEEE) 488 interface options for use with other equipments.

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The DPI 500 digital pressure controller

The front panel function selection is under full remote control, with calibration adjustments expedited via a drop down access cover which, in its normal position, protects the integrity of the span calibration settings. Available as either a single or dual range unit, the instrument facilitates a wide pressure calibration range. The dual range model provides a wider dynamic range and improved accuracy at lower scale settings.

Operating pressure ranges full scale can be specified between 0 to 7.5 kPa gauge to 0 to 3.5 MPa gauge and 0 to 35 kPa to 0 to 3.5 MPa absolute. Gauge versions are optionally available with -100 kPa gauge capability. Overpressure is rated at x4, causing negligible calibration variation, while an audible alert at x2.5 rated pressure is offered on dual range models.

A further introduction from Druck is the model DPI 700 low cost battery powered portable LCD digital pressure indicator, capable of monitoring pressure spanning 20 kPa gauge to 2 MPa gauge. Truly portable, with a purpose designed case moulded in durable polycarbonate, this robust unit gives adequate protection to both the front panel controls and display area, so allowing constant use in adverse environmental conditions, while the carrying case and neck strap aid portability. They also provide stowage for the pressure hose and relevant fittings. The DPI 700 is readily available with British Approvals Service for Electrical Equipment in Flammable Atmospheres (BASEEFA) certification for use in hazardous areas, and is intrinsically safe.

The 3.5 digit (+ 1999) LCD provides 0.05% full scale resolution to an accuracy of <+ 0.15 full scale. It has an over pressure capability of 200% full scale and is compatible with most common fluids. It has combined linearity, hysteresis and repeatability of <+0.15%, and is capable of sustaining some 100 hours of intermittent usage.

For further details contact: Druck Ltd., Fir Tree Lane, Groby, Leicestershire, United Kingdom, LE6 0FH.

COOLING TOWER WITH TEN YEAR GUARANTEE

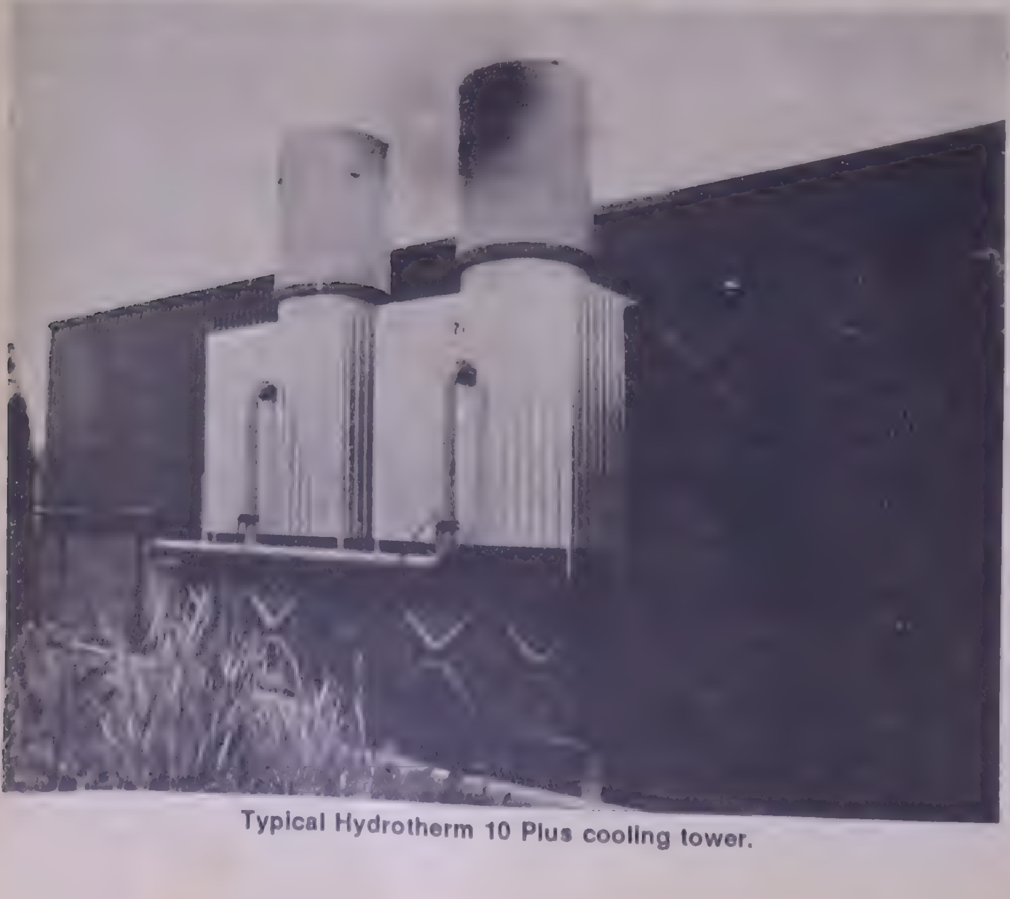
Water Technology Ltd. has announced an addition to its Hydrotherm range of cooling towers, the Hydrotherm 10 Plus. These new models incorporate a newly designed drift eliminator which, when incorporated in a Water Tech service contract, carries a ten year guarantee.

Under this scheme, the problems of corrosion, microbiological contamination, improper siting and lack of cleaning are eliminated. In a recent installation for Styropack (UK) Ltd. there was a serious microbiological problem, which was completely removed by a specially designed water treatment programme.

The heavy duty high efficiency spray eliminator used is of zig-zag pattern manufactured in Baltic Redwood, machined and then treated under pressure with Tanaligh "C" preservtive to British Standard BS5707 to give a good protection against dry, wet and soft rot, termite attack and fungi.

Other features include an axial flow fan unit directly driven by a totally enclosed motor with Class F insulation. The motor is treated to IP55 (Institute of Petroleum) and is specially manufactured with drain holes and anti-condensation heaters to ensure trouble free operation and very long life. All motors have been sealed for life bearings and hence require no maintenance.

The framework is of robust structural steel, and the external steel cladding is manufactured in galvanised sheet steel and plastic coated. The heavy duty cooling pack consists of vacuum formed 0.508 mm thick plates with contours designed to give maximum water/air contact, ensuring a high heat transfer coefficient. Each plate is self-spacing and self-locating and is glued together with a special solvent cement. These modules can easily be handled and removed from the tower for easy cleaning or descaling. The pack may be manufactured from polyvinyl chloride (PVC), high impact polystyrene or polypropylene according to maximum water temperature encountered in the tower.



Typical Hydrotherm 10 Plus cooling tower.

Further features include a non-clogging water distribution system and, in the heavy duty base tank, an integral anti-vortex/strainer box.

For further details contact: Water Technology Ltd., Powke Lane Industrial Estate, Blackheath, Birmingham, United Kingdom, B65 0AH.

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Because of the formation of halogenated hydrocarbons (trihalomethanes and high molecular organohalogen compounds) experts today regard the chlorination of drinking and surface water as a means of drinking and utilities water degermination with increasing scepticism. The great disadvantages of this method can be avoided by the use of chlorine dioxide. In a publication on chlorine dioxide for the degermination of drinking water Degussa AG describes further advantages that can be achieved with this product. Tables and diagrams and comprehensive bibliography round off the publication.

AUXILIARIES FOR PRINTING INKS AND SURFACE COATINGS

An effective auxiliary for the printing inks and surface coatings industry - Ceridust 9630 F - is developed by Hoechst AG, West Germany.

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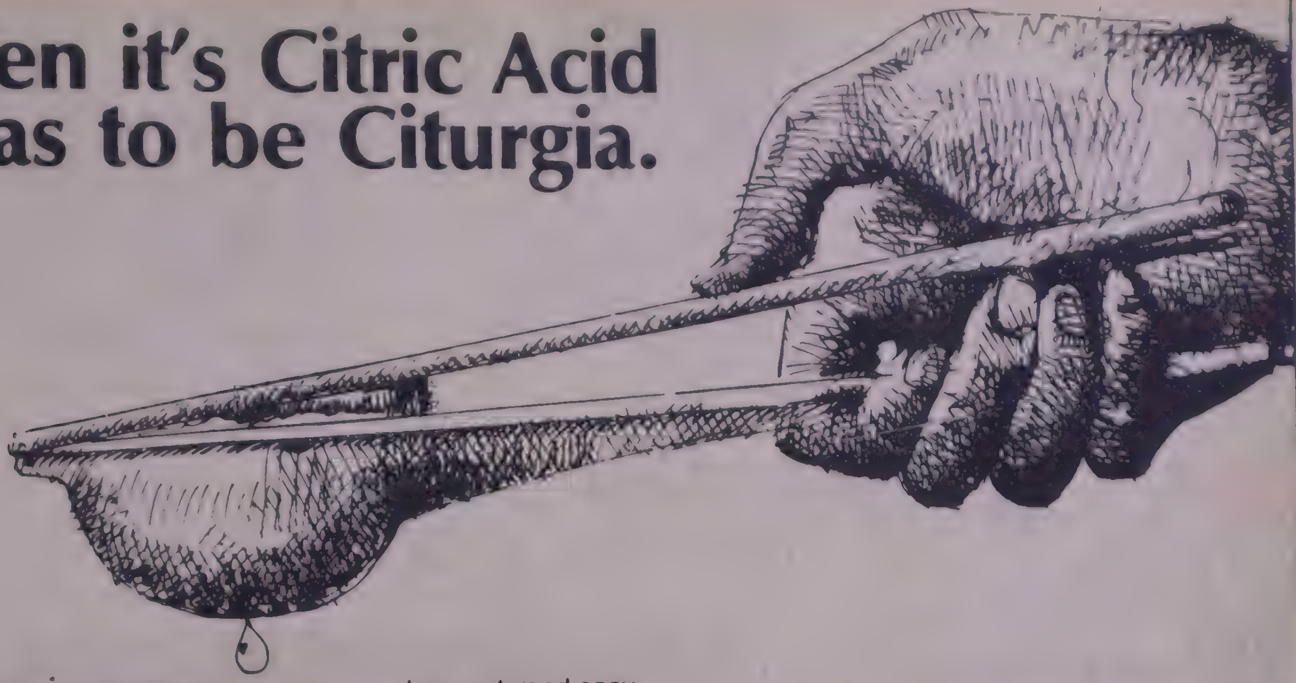

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Chemical News from Abroad

EEC PRODUCERS OPPOSE FREE TRADE WITH GULF STATES

Europe's Petrochemical producers are protesting strongly against what they see as a unilateral move by the EEC to bring about a free-trade agreement with the Gulf co-operation council (GCC). This would give tariff-free access to flows of petrochemicals from Saudi Arabia and other countries.

Ray Knowland, president of the association of petrochemical producers in Europe (APPE) has sent a strongly-worded letter to Claude Cheysson, EEC commissioner responsible for relations with developing countries, and other key figures involved in efforts to bring the EEC and GCC economically and politically closer. He warns of the potential dangers hatching for the chemical industry.

The producers' association wants to give some ammunition to sympathetic "friends" in the commission that are already opposed to Cheysson's openly-stated free-trade initiative.

APPE believes that there is a strong desire in certain parts of the commission to establish a free-trade agreement with the Gulf but says this will not achieve its primary aim — to bring security to oil supply and prices.

The price of such a deal would be to sacrifice the tariff barriers that exist around the EEC and which provide something of a deterrent to flows of petrochemicals from the Middle East. Some product from Saudi Arabia and other countries is allowed into Europe duty-free but in the main, duty is paid.

"Since 1985, GCC petrochemical output has come into Europe under the natural competitive advantage of low-priced ethane. The European industry sought no special protection in dealing with this competitive threat although it coincided with a period of serious over-capacity. However, Cefic, the spokesman organization of the industry at the time, insisted that the normal provision of Gatt should apply," the APPE comments.

It continues to say that, at the present time: "When important decisions regarding a negotiating mandate may be made" the EEC should bear in mind that Europe imports the major share of Gulf states' product already.

In plastics, for example in 1986, 38 per cent of all non-EEC imports of linear low density polyethylene came from the Gulf states. In comparison plastics imports to the US and Japan were small. Knowland and his APPE colleagues are convinced that removing tariff barriers in Europe would certainly inspire a new round of plant construction by Arab producers who would then have "a captive European market."

The APPE goes on to say: "The European industry has been a powerful generator of research and development. The weakening effect of a free-trade agreement would affect the industry's ability to fund R&D, with implications for the downstream sectors of the chemical industry such as fibres, plastics, pharmaceuticals, agro-chemicals and other high value/high technology industries."

It says Europe has already been generous in helping entry to its markets through the provision of the generalised system of preferences (GSP), which allows limited tariff-free access for products from developing countries such as Saudi Arabia, Japan and the US do not allow this.

APPE suggests that an Asean-type broad co-operation agreement, which still leaves tariffs intact, might be more appropriate for the EEC and the Gulf states.

OWL FACES WASTE DUMPING CHARGES

Odfjell Westfal-Larsen (OWL), the Norwegian chemicals shipping and storage group, is facing criminal charges in the US for allegedly dumping hazardous waste into the ocean off Houston, Texas. The charges are the first to be brought under the US Marine protection research and sanctuaries act (1980).

The company's US subsidiaries, Odfjell Westfal-Larsen (USA) Inc and Baytank (Houston) Inc, along with 19 employees were indicated on 37 counts by a US federal grand jury following an investigation by the Environmental Protection Agency's office of criminal investigation in Dallas.

A spokeswoman for the EPA said that OWL is also charged with offences under the Resources conservation and recovery act and the Clean water act. Individuals named in the indictment could face prison sentences and fines up to $250,000. The companies could face fines up to $1m.

According to the EPA, between 1983 and 1986 Baytank "wilfully and negligently" discharged hazardous chemicals "on numerous occasions" into a ship-turning basin near the US Gulf. The chemicals, including acrylonitrile (which is toxic and explosive) and ethylene dibromide (which is also toxic), were contained in waste water which was to be dumped at sea.

The company is also charged with forcing acetaldehyde (a highly flammable chemical) through a vapour-only flare and with contaminating rain-water which passed into US water systems. OWL denies the charges and intends to contest them.

HEYMAN LEADS $2.3BN BID FOR GAF CORP

GAF Corp. shareholders have received a $2.3bn takeover bid from a management team led by chairman Samuel Heyman. The buyout group is offering to pay $64 cash and $2.50 in debt securities per share.

Initial reaction to the offer was surprise, but Wall Street observers suggest that going private is a logical step for a company which has come to specialize in corporate raids.

Over the past two years, Heyman has led GAF into unsuccessful raids on Union Carbide and Borg-Warner. But both forays made several hundred million dollars profit for GAF in subsequent share dealing. The financial community, however, regards such takeover activity as diluting a predatory company's stock value.

LAPORTE PAYS $33M FOR U.S. SPECIALITY INORGANICS FIRM

U.K. speciality chemicals firm Laporte Industries has broadened its base in the U.S. with the acquisition for $33m of speciality inorganic chemicals concern Vinings Industries Inc.

Included in the deal is a new plant for the production of sodium aluminate, used mainly by the paper industry. The New Orleans-based facility, which was financed from Vinings' cash flow, is currently being commissioned.

Vinings' main manufacturing facility and headquarters are in Atlanta, Georgia. Output is aimed primarily at the U.S. paper processing and water treatment industries. Last year the company reported sales of around $15m with profits of $1.8m. Earnings, Laporte said, would have been some $3m without payments to shareholder owners that have now withdrawn from the business. Laporte is retaining the existing management to run the company.

Laporte's interests in water treatment chemicals and hydrogen peroxide (via its joint venture company Interox) provide good synergy with Vinings says the UK firm's chief executive, Ken Minton. There are plans to expand Vinings' business across the US from its current concentration in the south east and into Canada where Laporte and Interox already have interests. Vinings' technology will also be married with other Laporte businesses outside the US, especially the UK, South America and Australia.

Minton said, "Vinings has an enviable record of growth and high grade performance and is a strategically important acquisition for Laporte in North America. Not only does it secure for us a significant position in the rapidly-growing US market for high-grade technical service and process aid chemicals to the paper industry, and in water treatment applications, but it also provides a springboard for the group to develop this class of business in other countries around the world."

Additional growth will be achieved through the expansion of Pinings' existing product range by means of the introduction of water treatment products and services from Laporte's Widnes site in the UK.

Last year Laporte, which is the UK's second largest independent chemicals company, saw group sales total £422m with pretax profits of £64.2m. Its inorganic and organic specialities business had sales of £81m and profits of £12.6m, accounting for 20 per cent of group business worldwide.

VEBA-DYNAMIT DEAL APPROVED

West Germany's cartel authority has given the green light for Veba AG's takeover of Dynamit Nobel, the chemicals and plastics company currently owned by Feldmuhle Nobel. The deal, valued at DM400-450m ($221-249m), excludes Dynamit's explosives and industrial moulding activities.

Dynamit will be merged with Veba's Huls chemicals and plastics business, making the group West Germany's fifth largest chemicals outfit with sales of almost DM8bn. The cartel authority decided that the deal would enable Huls to compete on a more equal footing with West Germany's four leading chemicals groups, Bayer, Hoechst, BASF and Henkel. Huls had sales of DM5.5bn in 1986 and Dynamit's turnover was DM2.4bn.

Huls' major operations include industrial chemicals and plastics, but the company also produces synthetic rubber, surfactants, coatings and agro-chemicals. Dynamit will beef up Huls' existing operations, while adding silicon chemicals and the fibres intermediate dimethyl terephthalate to the company's total portfolio.

According to Ian Butcher of consultant CH Kline, Dynamit is now the second ranked producer of silicon and wafers in Europe behind Wacker. He estimates the company's market share around 23 per cent and sales about $25m. Dynamit has also invested in the US where it has around 6 per cent of the merchant market. Butcher says that although the silicon sector has suffered from overcapacity, the electronics market is now picking up and Dynamit is well placed to benefit.

Bundeskartellamt examined the impact that a merger of Huls and Dynamit would have on the West German plastics sector, but decided that it would not restrict competition. Huls, with capacity of between 340-380,000 ton/year, is a leading PVC producer with an 8 per cent European market share. Dynamit has a lease on a 70,000 ton/year PVC plant owned by Wacker, but this runs out in 1991.

The merger will not increase Huls' PVC capacity in the long run, but Dynamit does provide downstream integration into compounding.

Outside Europe, Dynamit will add around $150m to Huls, US sales of around $200m. Veba has indicated, however, that it is keen to make an acquisition in the US to provide a springboard for major expansion in the North American chemicals markets.

AIR PRODUCTS IN FRENCH BID

A new takeover battle is expected to erupt in the French industrial gases market following the news that US-based Air Products is interested in acquiring Strasbourg company, Oxygene Liquide. Trading in the company's shares has been suspended and the French ministry is studying a bid proposal from Air Products.

Earlier this year, the Swedish group Aga finally won a long-running take-over battle for Duffour et Igon but had to pay $98.5m, almost double the original takeover bid made by Union Carbide.

Oxygene Liquide supplies a range of industrial gases including oxygen and acetylene to the region around Strasbourg. Its sales were FF120m ($20m) in 1986 and the company employs 240 people. Oxygene's market share is around 1 per cent of the total French market.

France's giant industrial gases company Air Liquide owns a 31 per cent stake in Oxygene, with a consortium called Union Mobiliere Industrielle holding a 56 per cent share. Oxygene's shares are traded on the Nancy stock exchange and the price at the time of suspension was FF1,070 per share. This values the company at around FF35-40m. Local observers believe, however, that the final sale price could be two or three times this amount.

REPRIEVE FOR RHONE-SILTEC ?

Three foreign companies including Japan's Toshiba are interested in acquiring the troubled French silicon wafer maker Rhone-Siltec, according to sources in Paris. Based in Mentes-la-Jolie near Paris, Rhone-Siltec is scheduled to close later this month.

The silicon wafer unit, a subsidiary of Rhone-Poulenc and Mitsubishi, had sales of FF1.45m last year but has accumulated losses of FF100m ($16.5m) since 1983.

Rhone-Poulenc, which owns a 65 per cent stake in the company, announced last month that it would close the plant unless a buyer could be found.

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Chemical Markets Abroad

EEC FIXES VAM DUMPING DUTY AS MARKET TIGHTENS

A new definitive anti-dumping duty on imports of vinyl acetate monomer (VAM) from the US has been instituted by the European commission. The move is likely to fuel further price rises in a currently tight market.

A duty on US VAM imports was originally set by the commission in 1981 after complaints that US producers were dumping product in Europe at margins of up to 39 per cent. A general duty of 14.27 per cent was set in May 1981 with a further 5 per cent being added in 1984.

The duty would normally have expired in 1986, but the European council of chemical manufacturers' federations (Cefic) asked for a new investigation, alleging that dumping practices were continuing.

The commission conducted a survey of the major US producers including Celanese Chemical, Gantrade Corp and Phillips Petroleum Chemicals as well as the four major European producers, Rhone-Poulenc, Hoechst, Montedipe and BP Chemicals.

Despite opposition from some importers of US product, the commission found that dumping was continuing, with margins of between 5.8 and 17.4 per cent. It agreed that harm had been done to EEC producers with imports increasing and European VAM production dropping off.

The community processing indutry which uses VAM contended that safeguard measures would be "economically inopportune" because they would diminish competitiveness. However, the commission thought that measures were in the general community interest and has imposed a general duty rate of 15 per cent with 10.5 per cent for Phillips Petroleum, 6 per cent for Gantrade and 5.9 per cent for US Industrial Chemicals.

The duties are expected to have little immediate effect in Europe, as US imports have recently been tailing off as producers are meeting production problems. Celanese has been having problems with acetic acid and VAM production and a number of other companies have experienced production difficulties which have seriously disrupted supplies. US prices have firmed up to 24-25 cents/pound ($528-551/ton).

In Europe, prices have been firming in 1987 after a severe drop last year. The market is tightening with demand increasing, particularly from emulsion paint producers. Supply has been affected by several maintenance shutdowns which have left producers struggling with low stocks.

From a low of DM1,150-1200/ton at the beginning of the year VAM prices have risen to around DM1,400-1,500/ton in the third quarter. With the supply situation unlikely to be resolved for some time, 4th quarter contract ideas have been heard as high as

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M1,500-1,600/ton. With sup- y so tight, rumours have been rculating that Hoechst might e considering a restart at its othballed 75,000 ton/year VAM cility at Tarragona, Spain. But e VAM market is still consid- ed one of the most unstable nd could be set for a shake up early 1988 when US supply egins to reach Europe again.

ANADA IMPOSES OTASH CURBS

The Saskatchewan govern- ent has introduced stiff legis- tion controlling potash output a bid to drive up prices.

The first production quota is xpected to be set for October ith fines of up to Can$1m $760,000) plus $50,000 per ay for violators.

The move represents another low to Canada's troubled po- ash industry. At the end of Au- ust, the US commerce depart- ent recommended severe anti- umping penalties against Cana- ian potash after complaints om high-cost US producers. askatchewan premier William evine responded by threatening embargo all US potash ship- ents if the US imposed anti- umping penalties.

Devine has hinted that the gislation could mark the begin- ing of a world potash produc- rs' cartel. The current global otash surplus stands at around m ton. With Saskatchewan, upplying around 40 per cent of orld potash, the legislation is tended to force up prices but far there has been no indica- on of what level is being targ- ed.

Reaction to the government's ove has been mixed. Critics ave predictably accused Devine f handing over the market to askatchewan's competitors. John Gordon, vice-president of Noranda Mines which owns Central Canada Potash called it a "very blunt instrument", saying it would be extremely difficult to control.

Producers are concerned that if the price is forced up too high, US farmers could stop buying. The US currently takes around 55 per cent of Canadian potash exports. Sales of Canadian potash to the US amounted to 2.89m ton, valued at Can$425m for the first five months of this year.

UREA DUTY EXTENDED

The European Commission has extended the period of provisional anti-dumping duty on imports of urea from eight countries for a further two months from September 10. Those countries affected are Czechoslovakia, East Germany, Kuwait, Libya, Saudi Arabia, the USSR, Trinidad and Tobago and Yugoslavia.

In May, the commission imposed a provisional duty on urea imports to bring them up to a level of Ecu133/ton ($155/ton) before customs duties. The regulation was set for four months pending definitive measures, but a final ruling has been postponed until all the exports have stated their cases to the commission.

The anti-dumping duties on urea met with protest from the European fertilizer import association (EFIA) in June. It claimed that farmers' access to urea at world prices was becoming increasingly restricted and the move would add yet more burden to the hard pressed agricultural sector.

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News from the American Market

AVTEX RAISES RAYON STAPLE PRICES

In a continuation of industry-wide moves to higher rayon prices, Avtex has raised tabs for all types of regular rayon staple by 5 cent/lb, effective Oct. 1. Avtex has led the price increases with a 5% rise in the price of high-wet-modulus staple (HWM), effective Aug. 1. BASF followed the HWM increase and also raised regular staple 5 cent/lb, effective Nov. 1. Courtaulds, which does not make HWM staple, also increased the price of regular rayon, effective Oct. 1. James E. Crutchfield, president of Avtex Fibres, says rapidly escalating raw material costs make the rayon increases necessary. Rayon staple shipments in the U.S. during the first half of 1987 were up only 1.2%, to 199 million lb, says the Textile Economics Bureau, but shipments in the month of June rose 9.9% from a year earlier.

DEAD SEA WORKS EXPANDS CAPACITY

Israel's Dead Sea Works will boost its potash capacity from 2.1 million metric tons/year to 2.3 million m.t./year by next year and is considering a further expansion to 2.7 million m.t./year in the mid-1990s. The company sold 2.1 million m.t. of potash in 1986-87, up 14% from the previous year, and expects to ship 2.25 million m.t. this year, from current production and inventories. Arye Shachar, managing director, says that the company's earnings of $32 million on sales of $185 million in the fertilizer year make it unique among Western potash producers. The company expects to widen its gains as a result of the 10-12% boost in the price of potash for all contracts.

WEST GERMANS CUT BACK POTASH PRODUCTION

BASF subsidiary Kali und Salz lost money in 1986 and sees little improvement in 1987. The company's sales fell 18%, to $767 million ($ = 1.83 German marks), in 1986, demand is flattering, and the company says that prices are "stabilizing at a depressed level." Last February, BASF decided to close down three mines : Siegfried-Giesen near Hildersheim: Bergmannssegen-Hugo near Lehrte; and Kaliwerke Salzdetfurth, Bad Salzdetfurth. A key problem, the company says, is that it is required to spend large sums on pollution control, while its French competitors need not incur such costs. Kali und Salz says a "substantial portion" of its 1986 spending was for environmental protection.

EAST GERMANS FOCUS ON BRAZIL FOR POTASH

Brazil imports virtually all the potash it uses, with imports projected at 1.8-2 million m.t. this year. East Germany's Kali Bergbau is the big supplier, accounting for 38% of Brazil's imports of 883,000 m.t. in the first half of 1987. East Germany is such a major supplier to Brazil because of a standing agreement for countertrade, set up to reduce Brazil's huge trade surplus with East Germany. The value of imports from East Germany is debited against the Brazilian balance in a clearing account, and the Brazilian importers buy from its government, paying in Brazilian currency. Canadian suppliers, despite the East German advan-

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ge, had a healthy market slice the first half of 1987, with th Canpotex and Potash Co. of nada providing substantial ton- ge.

N ACRYLONITRILE SQUEEZE FORECAST

Acrylonitrile will become in- easingly tight during the next w years, according to a multi- ent study by Chemical Market ssociates (CMAI), a consulting cup based in Houston. CMAI ojects that U.S. demand for e intermediate will reach 3.9 llion m.t. by 1990, compared th 3.5 million m.t. in 1986. e key factor will be expansion acrylic fibre capacity, particu- ly in the Far East. Fibres ac- unt for about 68% of world mand for acrylonitrile. CMAI recasts that Far Eastern users acrylonitrile will increase their t imports of the material by 0,000 m.t./year by 1990 and pects that the world-wide acry- nitrile industry will operate at % of capacity for the rest of e 1980s.

EXACO PLANS A PROPYLENE XPANSION

Texaco will reactivate and odernize idle equipment at its Port Neches, Tex., plant to recover chemical-grade propylene from refinery streams produced in its nearby Port Arthur refinery. The unit, consisting of purification facilities associated with an idled ethylene plant at the site, will have capacity for 300 million lb/year of propylene when completed in January 1989, compared with 70 million lb/year when the plant was shut down in 1981. It will coproduce about 100 million lb/year of ethylene, and both products will be marketed. Other coproduced materials — ethane, mixed butane and naphtha — will be used as feedstock.

WITCO BOOSTS T[illegible] PRICE OF ALUMINIUM CHLORIDE

Rising prices for aluminium have led to an increase of 5 cent/lb on aluminium chloride by Witco Chemical's Argus Div. The company comments that the price of aluminium has risen 60% since beginning of this year and 100% during the past 18 months. The list price for 40,000-lb minimum orders of aluminium chloride in bulk moved from 52 cent/lb to 57 cent/lb, and the semibulk price in 5,000-lb-bin minimum quantities rose from 56 cent/lb to 61 cent/lb.

SINGAPORE HIT BY POWER FAILURES

Power failures in Singapore during the past year have cost the country's only petrochemical complex some $6m in lost production, according to an official of the owner of Petroleum Corporation of Singapore (PCS).

One power failure which lasted only one hour earlier this month cost PCS $2m. Three days' production at the complex was lost as the entire site had to be closed down. According to the PCS official, an expert had to be brought from Japan to handle damage to the plant, located in Pulan Ayer Merbau.

This latest power failure also hit a number of oil refineries. Shell, Esso and Mobil said they had all been badly affected. Executives of PCS and the Singapore government which owns a one-third stake in the complex are currently discussing the cause of the failure, but the government has declined to comment pending further investigation.

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In the European Market

Naphtha prices have slipped by around $5/ton in the past week, but steadied mid-week at $153-156/ton cif North West Europe for cargoes, and $154-156/ton fob ARA for barges. Most speculative buying interest is concentrated on October, and September business is thin. Mediterranean prices are slightly depressed at around $151-154/ton cif for cargoes.

Propylene prices are still weak at DM480-500/ton cif North West Europe reflecting poor demand from derivatives producers, and surplus supply. Demand has been hit by problems with derivatives plants in Europe.

Ethylene prices are still firm at $500-510/ton cif NWE, and traders report a hardening trend. In addition to the rumours of Saudi shortages resulting from the explosion to a gas separation unit serving Al Jubail, ROW in Wesseling, West Germany, is closing production for one week.

A severe US shortage has pushed up European butadiene prices by another $ 10/ton to $ 540-550/ton. U.S. prices are up to 30 cents/pound compared with 26 cents/pound for contracts. Far East demand is strong, with prices in Korea equal to around $560/ton fob Rotterdam.

Benzene prices have picked up slightly to $265/ton on the back of reduced HDA activity. But trading has been quiet. Although firm discussions are unlikely to start until later in the month, a fourth quarter contract price range of DM500-600/ton is being talked already.

Toluene prices are weak but steady at $205-210/ton despite low demand and a drop in HDA activity. Chemical demand is slow although there has been some minor interest for gasoline blending. US spot prices are quoted at 68 cents/gallon, which translates into around $195/ton fob.

Xylenes prices have dropped by $ 10 to $ 235-245/ton in response to slack demand. One small virgin parcel sold this week at $ 260/ton cif.

Orthoxylene prices have slipped by another $ 20/ton in a market of poor demand and steady supply. Prices as low as $270/ton were heard on the market as we went press.

At $318-323/ton **paraxylene** prices are under downward pressure from slack fibres demand. Of the recent 4 000 ton tender in India, half has been done at $325/ton cif Bombay. End-user stocks are high, and good quality Soviet material is on offer in Rotterdam. US spot prices are quoted at around 17 cents/pound.

Styrene prices are holding up well at $1 230-1 250/ton fob for T2 and $1 125-1 135/ton cif NWE T1. Prices as low as $1 000/ton have been heard in the Far East. US spot prices are hovering around 50 cents/pound.

Methanol prices are steady in local currencies at DM227-23[illegible]/ton fob Rotterdam, but a weaker dollar has pushed up prices slightly in dollar terms to $12[illegible]-128/ton fob. T1 material has risen to $107-110/ton cif NWE.

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News About New Projects

TOYO IN $ 100M SOVIET AMMONIA PLANT DEAL

The Soviet Union, the world's largest producer of ammonia, is going ahead with plans to expand capacity. It has awarded a major contract to Toyo Engineering covering the revamp of four plants which were originally supplied by the Japanese contractor.

Valued at approximately $ 100m, the dollar-denominated contract calls for the expansion by 25 per cent of units at Nevinnomyssk, Severodonetsk, Novomoskovsk and Novgorod. These 1,360 ton/day units were the first of 32 identical gas-based ammonia plants (except for Angarks which is based on naphtha) to have been awarded to Toyo during the late 1960s and in the 1970s. M. W. Kellogg provided the process technology.

Delivery schedule of the contract is for 1988-89 and the revamps, which will raise capacity of each plant to 1,700 ton/day, will be carried out during the annual shutdown.

The contract is based on compensation and Mitsui, which is part of the same group, will handle this part of the contract. The companies declined to reveal details of the quantities involved in the buy back but at today's ammonia price of $130-$ 135/ton Mitsui could end up with some 770,000 ton of the product. Compensation arrangements are normally spread over a period of 10 years so that some 80,000 ton/year could be sold under the arrangement. Final quantities, however, will depend on the price of ammonia at the time compensation begins.

The Soviet Union intends to revamp and expand capacity of 12 of the original Toyo units The eight not included in Toyo's deal will be duplicated by the Soviet Union's own staff.

Negotiations with Creusot Loire Enterprise, a subsidiary of Technip of France, meanwhile are still continuing to revamp two plants at Odessa and two at Gorlovka. These units, which also use Kellogg's process, were supplied by Creusot Loire.

The Soviet Union's current ammonia capacity is estimated at 30m ton/year. The expansion will give the country an extra 1.8m ton/year.

Earlier this year Toyo signed a contract worth $50m to revamp two ammonia plants at Piesteritz in the GDR. These plants, originally delivered by Toyo, will also be expanded to 1,700 ton/day.

TOYO WINS ORDER IN THAILAND

Toyo Engineering of Japan has won a letter of intent to build a new PVC complex in Thailand. The contract, valued at around $90m, will be signed during October.

Under the terms of the deal Toyo will build a new complex for Thai Plastics & Chemicals Co at Mab Ta Pud, near the site of the new upstream petrochemical complex currently being built for the government-owned Thai National Petrochemical Corp.

The turnkey job calls for the construction of plants for 26,000 ton/year of chlorine, 140,000 ton/year of vinyl chloride monomer and 60,000 ton/year of PVC.

Thai Plastics & Chemicals Co is a joint venture between Japanese and Thai interests. Mitsui and Asahi Glass hold 50 per cent in the company. The remaining 50 per cent is in the hands of local interests.

Asahi Glass is supplying its ion exchange membrane technology for the chloralkali plant while Mitsui Toatsu Chemical will supply the VCM and PVC processes.

Ethylene feedstock for the ethylene dichloride unit will be supplied at a rate of 40,000 ton/year from the 265,000 ton/year (later to be expanded to 315,000 ton/year) ethylene plant at Mab Ta Pud. This ethane cracker is being built by Toyo Engineering and uses the Lummus process. A UOP-process dehydrogenation plant attached to the upstream plant will produce 105,000 ton/year of propylene which will be supplied to a new polypropylene plant. Some EDC will also be imported.

Thai Plastics & Chemicals already has a 34,000 ton/year Mitsui Toatsu-process PVC plant near Bangkok and part of the VCM from Mab Ta Pud will be supplied to that unit.

Construction will be carried out to tight schedule and commissioning is due at the end of 1989.

KTI IS SUBSIDIARY OF MANNESMANN

KTI the Dutch engineering contractor, has a new owner. Dr. Joachim Garnjost, chairman of the board of Mannesmann Anlagenbau (MAB) of Dusseldrof, West Germany, and Jacob Voogd, president and chief executive officer of the KTI group have announced that KTI has accepted an offer by MAB to acquire a 70 per cent stake in KTI, effective September 7, 1987. Financial details were not disclosed.

MAB, a part of the Mannesmann group, executes over DM-2bn/year worth of contracts in plants and pipelines, and is in-erested in deeper market penetation. It is keen to diversify its ctivities into process engineerng and build a larger internatioal presence. It is interested in ctive co-operation with KTI on arger projects, including gas plants, chemical plants, waste disposal technologies and cogeneration.

KTI will continue to operate under the management of Jacob Voogd, the company's founder and previous majority owner, along with some employees. Its board will consist of Dr. J. Garnjost, Dr. E. Bitterlich, Dr. H. M. Siepert (all of MAB), and Dr. M. F. Ondrus and Dr. Z. Merszei, already on the KTI board.

Employing 800 people worldwide, KTI last year achieved a 50 per cent increase in sales to $185m. It is one of the largest ethylene furnace engineering companies in the world having supplied 20 per cent of the world ethylene capacity. The new partnership will allow KTI to go for bigger contracts.

JOHN BROWN AWARDED ICI PP CONTRACT AT ROZENBURG

John Brown BV, the Dutch subsidiary of the UK's John Brown, has been awarded a contract to expand ICI's polypropylene plant at Rozenburg in the Netherlands. The project forms part of ICI's recently authorized £20m investment to add 110,000 ton/year capacity at Rozenburg and at Wilton in the UK.

The Wilton project will absorb more than half the investment as new catalyst manufacturing capacity is being set up there. The company declined to detail the split of new capacity because it regards it as : "debottlenecking rather than building new plants". It says, however, that there will be more added at Wilton than Rozenburg.

The Wilton project is being handled by ICI's own engineering department although some work will be put out to local subcontractors on Teesside.

All the new capacity currently being added will use gas phase technology, based on the BASF process. When completed in early 1989 ICI will have a total of 410,000 ton/year of PP capacity, including 300,000 ton/year gas and 110,000 ton/year diluent phase.

Although the diluent process unit, which is located at Wilton, will eventually be phased out, there is no decision on when this will be done. The company says that it will be in line market conditions.

At present ICI has 100,000 ton/year capacity at Rozenburg and 200,000 ton/year at Wilton.

Built by Crawford & Russell (now John Brown BV) in 1979, the Rozenburg plant was originally designed to produce 60,000 ton/year. Debottlenecking by John Brown has brought the unit to the present capacity.

ICI currently ranks as Europe's fourth and the world's sixth largest PP producer. The new investment is expected to put it Europe's joint number 2 producer with Hoechst, after Himont.

AIR PRODUCTS EXPANDS UNITS

Air Products & Chemicals is expanding production of polyamines by 9,000 ton/year. The project, which will be realized through plant modifications at an existing location and using proprietary process, is due for completion in mid-1988.

The new products include diethylenetriamine (DETA), triethylene-tetramine (TETA), and higher molecular weight ethyleneamines. These are used in applications such as lube oil additives, paper wet-strength resins, polyamides, epoxy curing agents and other fatty chemical derivatives.

Approximately half of the new capacity is already committed under long-term contracts. The polyamines will be produced at the company's alkylamines plant in St Gabriel, Louisiana — utilizing excess capacity which has become available due to the decline in demand for herbicide intermediates produced at the facility.

Robert E. Gadomski, vice-president and general manager of Air Products' industrial chemicals division said the move strategically extends the company's amines business and builds on its knowledge of carbon-nitrogen chemistry and its position as one of the largest US suppliers of methyl, alkyl, and selected speciality amines. Some of the uncommitted capacity will eventually be used to produce raw materials for new amine products.

Air Products' technology, which has been demonstrated in two full-scale test runs, uses ethylene oxide-based feedstocks, primarily monoethanolamine and and ethylene diamine. It is a cost-effective alternative to traditional processes which uses ethylene dichloride and produce large quantities of salt effluent and co-product ethylene-diamine, which is in oversupply.

Air Products manufactures methyl and higher amines at world-scale production facilities at Pace, Florida, and St Gabriel, Louisiana. Within the past three years the company has made two other major moves to expand its amines business.

In 1984 it expanded its chemical facility at Pace, Florida to manufacture morpholine. In 1985 it moved into speciality amines with the purchase of Abbott Laboratories' industrial chemicals business.

Plastic Markets Abroad

US ENGINEERING PLASTICS POISED FOR HEALTHY GROWTH

The North American engineering plastics market is set to grow by 7 per cent a year, with demand topping 820 000 ton by 1991, according to a new report Engineered plastics from US consultant, The Freedonia Group. New uses, product innovation and improvements in both processing and fabricating techniques will all combine to fuel this growth.

Although engineering plastics can cost anywhere from four to 50 times more than commodity plastics, the study points out that their unique blend of qualities — toughness, strength, mouldability, heat resistance — give them properties and price/performance ratios superior to competitors such as metals, glass and ceramics.

These plastics have also benefited from the need to reduce weight (especially in automobiles) and they can provide multifunctional parts and offer production economies and low-cost assembly/fabrication techniques, according to Freedonia.

Conductive polymers, polyimides and fluoropolymers are likely to gain most from processing and material advances, the report says. Conductive polymers will show very rapid growth in the 1990s, and inherently conductive varieties will provide a new range of possible applications such as storage batteries, speciality wires and cables, resistors and capcitors. Filled conductive polymers will also find widespread use in antistatic and electromagnetic interference protection.

Polyimides, the report forecasts, will also see fast growth based on their excellent electrical properties at high temperatures. But will still account for under 2 per cent of total engineering plastics. Fluoropolymers growth will come from structural and non-structural uses in industrial and electrical components.

Nylon is expected to retain many of its markets due to advances in fillers and reinforcements, Freedonia says. But the report points out that markets for some older engineering plastics (i.e. polyacetal and the fluoropolymers) and nylons are maturing. By way of example, the report says that polycarbonates have now reached a high point in their penetration of glazing markets which are themselves slowing.

Newer materials such as polysulphone, polyphenylene oxide, polyphenylene sulphide and thermoplastic polyesters, will achieve faster growth as more grades are developed and applications diversify, the report says. Many speciality materials are also gradually evolving into complete polymer families.

Markets for engineering plastics will continue to be dominated by the electronics and electrical sector due to the dynamic nature of the industry and proliferation of new applications, the report contends. High growth areas include compact discs and housings for office equipment.

The second largest market for engineering plastics is the automotive sector and Freedonia forecasts that this will be the fastest growing area due to better resins and processing methods.

Construction will be a maturing market for engineering plastics, the report says, along with consumer products.

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Technological Scene Abroad

A NEW ROUTE TO MALEIC ANHYDRIDE

Shin-Daikyowa Petrochemical will commercialize a new route to maleic anhydride at Yokkaichi, Japan, S.C. Arnold, a Lummus Crest engineer, reported last week to a meeting of the American Institute of Chemical Engineers (AIChE) in Minneapolis. The company has scheduled startup of a 15,000-metric-tons/year plant for late 1988. The process, dubbed Alma, has been developed to the semicommercial level by Alusuisse Italia and Lummus Crest. Arnold told delegates that the economic advantages of the process derived from the use of n-butane feed, a fluidized-bed reactor system and a nonaqueous recovery system. Variable costs, Arnold says, could be from $100-300/m.t. lower than those of current processes. Capital costs are also lower than with the older routes, which use expensive fixed-bed reactors.

C_4 SEPARATION BY EXTRACTIVE DISTILLATION

Because of their high reactivity, butenes are increasingly being used as feedstocks. However, their recovery from a mixed C_4 stream is difficult because their boiling points are so close. Now Krupp-Koppers has come up with an extractive distillation process that could make the job much easier, the company's Gerd Emmrich told AIChE delegates. In the process, called Bugatex, a selective solvent changes the vapor pressure of the components in the feedstock in such a way that butane and butene can be separated from each other by distillation. The solvent, from the morpholine group, is made on a commercial scale and is inexpensive, Emmrich says. So far, there are no commercial plants, but the route has been extensively tested in a pilot plant. The process is offered in the U. S. by Krupp Wilputte (Murray Hill, N. J.).

SUMITOMO PURSUES ORTHOPEDIC MATERIALS

Sumitomo Cement and two other Sumitomo group companies aim to develop orthopedic materials based on the companies' synthetic hydroxyapatite, a porous substance found in bone. Japan's Ministry of Health and Welfare has already given the green light for Sumitomo to produce the biocompatible apatite; the substance features a network of spherical pores and ducts that encourage the transport of blood and nutrients that foster bone formation. In a joint venture formed last year, Sumitomo started developing a dental root from a hydroxyapatite-containing ceramic. The ministry has yet to set the official synthetic material prices, which would be used to calculate coverage benefits under government medical insurance. Sumitomo Chemical and its affiliated firm, Sumitomo Pharmaceutical, will develop the specific orthopedic products, which Sumitomo Cement will manufacture.

HOW MUNICIPAL INCINERATION FORMS DIOXINS

Researchers at the University of Waterloo (Waterloo, Ont), say they have uncovered the mechanism by which dibenzo-para-dioxins form during incineration of refuse. F. W. Karasek and L. C. Dickson found that fly ash catalyzed reactions that formed dioxin from any one of three aromatic starting compounds: chlorinated and nonchlorinated phenols, nonphenol compounds. Fly ash, Karasek and Dickson say, catalyzed both chlorine transfer and molecular rearrangement. These reactions occurred under neutral conditions and at temperatures from 250-350 C. The researchers also found that fly ash formed at different incinerator sites produced varying amounts of dioxin, raising the possibility that a change of incinerator design or operating conditions might reduce dioxin formation.

ANOTHER ADVANCE IN SUPERCONDUCTIVITY

A dependable method for making thin films with materials that are superconducting at room temperature has been developed by Jagdish Narayan, a professor of materials science and engineering at North Carolina State University (Raleigh). The method involves using a high-energy laser to irradiate a bulk sample of a superconductor made of yttrium, barium and copper oxides. That vaporizes the superconductor, which then deposits in a thin film on a substrate. To date, Narayan has used as substrates silicon dioxide and sapphire, as well as strontium titanate and magnesium oxide. An unexpected result of that deposition process, says Narayan, is that the resulting superconducting film seems to retain superconducting properties longer than does the bulk superconductor.

Environment

EEC STRUGGLES WITH DEADLINES

Owing to a lack of resources, the UK health and safety commission is claiming that it is having difficulties meeting the European commission's deadlines to implement adaptations to technical processes for the classification, labelling and packaging of dangerous substances directive. According to commission sources the situation is similar in other member states.

The UK health and safety commission has recently sent out a consultative document concerning changes arising from the seventh adaptation to the dangerous substances directive and the second adaptation to the paints directive.

The seventh adaptation requires for the first time the labelling of 27 substances that "may cause cancer" with the safety instruction "avoid exposure — seek special instructions before use". In addition a total of 60 new substances are now on the approved list.

This adaptation should have been published by July of this year and is to be implemented by the end of the year. But this timetable is unlikely to be met owing to a severe lack of resources, an HSC spokeswoman has said. To make matters worse the European council of ministers adopted the eighth technical adaptation last month.

The latest adaptation adds a further 29 substances to the "may cause cancer" category and member states are obliged to transfer them into national legislation before April 1, 1988. "The timetable is pretty tight and it will be tricky for us to catch up," the HSC spokeswoman added.

Although there are no precise details concerning implementation of these adaptations it does appear that while there are no political problems there maybe technical, delays. "With two adaptations coming so close together it may be difficult for some member states to keep to deadlines although we will keep a close eye on implementation," a European commission spokesman said.

SO_2 PROTOCOL

The "Protocol on the reduction of sulphur emissions or their transboundary migration by at least 30 per cent" has been ratified by 16 nations and went into force on September 2, 1987, says the United Nations economic commission for Europe. This is the first binding international treaty with specific measureable targets for air pollution reduction.

COURT CLEARS MONSANTO

Monsanto has been absolved, by a federal appeals court, of knowingly exposing seven workers to dioxin. But the court found the chemicals giant guilty of risking a worker's health by exposing him to the rubber additive para amino biphenyl (PAB).

The three-judge panel of the 4th US circuit court of appeals in Charleston, West Virginia, upheld the findings of last year's test case. The employees' claims that the chemical giant was aware of the dangers of dioxin when they were exposed to the chemical while working at the West Virgina-based Nitro plant in the 1950s and 1960s were rejected.

Damages, however, were awarded to one plaintiff after he proved that he had contracted bladder cancer following occupational exposure to PAB. Monsanto is now considering the panel's opinion before taking any further action.

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Biotechnology

DUTCH GOVERNMENT URGED TO SPEND MORE ON BASIC R & D

Vnci, The Dutch chemical industries association, and KNCV, the Dutch royal society of chemistry, are jointly caling on the economic affairs and science ministries to increase their support for fundamental chemical research.

In a report, presented to the ministries, the two groups claim that industry is willing to pay its share for applied research but the government should show greater commitment to basic R&D.

The two associations have produced the report to highlight those areas of basic chemical research that are of high scientific value and have commercial potential. "One problem in the Netherlands is that many proposals are adiudged to be important but funding is not always forthcoming," a VNCI spokesman said.

More support should be given to six significant areas, to ensure the future of the chemical sector in the Netherlands, the report claims. One of the most important areas in need of more fundamental research is the study of catalyst structure and function. The associations also think researchers should attempt to develop catalyst for the production of high value products such as fine chemicals.

Newer advanced materials should also be investigated, the report urges, particularly new composites and ceramics which are already considered to have a bright commercial future.

Although other areas earmarked by the associations do not have such a clear cut future they would make a valuable contribution to greater understanding of chemical reactions.

"Thin layer technologies need to be studied to increase understanding of properties of thin layers particularly concerning corrosion mechanisms and the development of coatings,". the VNCI spokesman said. Similarly, the chemical industry would benefit from rheology research. These efforts would go a long way to revealing how materials behave under stress.

Further research is also thought necessary for theoretical design of molecules, particularly agrochemicals and drugs, and specialized separation techniques. "It is hoped that separation methods such as membrane filtration can be made more specific to allow for the collection of desirable substances from similar chemicals."

The two associations have avoided highlighting biotechnology because this is the subject of another report written by them in collaboration with the pharmaceutical manufacturers' association. This report also calls for greater support for basic research.

Similarly, a recent report from the OECD is recommending more funding for Dutch fundamental research. "The ratio of civil R&D expenditure to GNP has been rising quite rapidly in Japan, the US and several European states whilst it has been relatively static in the Netherlands," the OECD claims.

"The industrial structure of the country and the very big expenditure of the five large (Dutch) firms do not suggest any grounds for believing that the Dutch economy can afford to continue without any improvement. So although we are certainly not advocating increased expenditure for its own sake, we are supporting the view that to maintain its international competitive position, the Dutch government should increase its commitments to the quality and strength of the R&D system as a whole," the OECD report concludes.

CAL BIO FORMS SWEDISH VENTURE

California Biotechnology, the US biotechnology outfit, is poised to establish a joint venture with three Swedish institutional investors. The new research and development biotechnology company, to be called Karo Bio, will be set up by the end of the month with a market capitalization of $35m.

The US firm will be taking a 30 per cent equity stake in the new company using both cash and technology. The other investors are the National pension fund, the AMF insurance company and the Swedish investment bank. A further 15 per cent is expected to be held by employees of the new firm.

A science advisory board has already been established to develop Karo Bio's programme of research. While a precise potential product portfolio has not been revealed, the programme is expected to complement the research of the US parent and its Australian joint venture, Pacific Biotechnology.

Karo Bio, to be located at the Karolinska institute, is likely to focus on healthcare products associated with ageing. Oesteoporosis, infectious diseases and senile dementia will be key areas for research.

California Biotechnology sees its two joint ventures as an opportunity to take advantage of both technology and venture capital opportunities in Sweden and Australia. In the longer term, co-operative marketing deals are expected to be established between the companies.

UNIDO PROJECT

Unido, the United Nations industrial development organization, has finalized the programme for a three-year biotechnology programme devoted to the needs of the developing nations. Funds and premises are already in place and Unido is now recruiting a team of scientists.

The centre, according to Ananda Chakrabarty one of the driving forces behind the project, is not in the business of making money by selling products, but will train people and conduct basic research and development. "If certain unique products result from the R&D then the patent will be licensed to the member countries (of the Programme) to exploit in ways they deem suitable," he added.

VACCINE APPROVALS

Smithkline Beckman has won marketing approval for its gene-spliced hepatitis B vaccine, Engerix B, from three European states. West Germany, the UK and the Netherlands have all granted regulatory approval.

This brings the total registrations for the product to 21, with applications pending in more than 60 other countries. SmithKline has still to apply for US approval. Although the first approval was not granted until the end of last year, the company claims to be satisfied with marketing results.

US TEAM SEEKS PHOSPHATE FERTILIZER ALTERNATIVE

Researchers at the university of Arizona are investigating a genetic trait that could have an enormous impact on phosphate fertilizer technology. The team, led by Dr. Allan Goldstein, has unveiled the genetic basis of phosphate solubilization present in bacterial and higher plants.

Most soils have a reservoir of insoluble phosphate while the level of usable soluble phosphate is limiting. Although plants do have the necessary genetic information to solubilize phosphates for uptake the level of this activity only provides enough phosphate to allow basic growth and seed setting.

"The system does not operate at levels to support agronomically desired rates of growth," explains Goldstein. To compensate for this farmers spend approximately between $8bn and $10bn annually on phosphate fertilizers. In addition to the cost there are also problems with pollution.

Goldstein and his co-workers are currently identifying the genes responsible for phosphate solubilization and have discovered the system is only switched on when soluble phosphates are scarce. "We are hoping to be able to modify the system to promote over expression of the key genes so that plants can solubilize the phosphate reservoir and take up the nutrient to support agronomic levels of growth."

This biorational approach to fertilization is analogous to the efforts on nitrogen fixation but, according to Goldstein, the phosphate process is much simpler. This system involves fewer key genes, plants already have the genetic machinery for control and the process does not require the strict anaerobic conditions needed to support nitrogen fixation.

Two approaches are now being used by the Goldstein team to make this promise a commercial reality. One technique involves engineering the genes to promote production of key enzymes while also adopting the method of somaclonal variation to find plants that already possess enhanced phosphate solubilization properties.

Goldstein predicts that the commercial promise will be realied by the turn of the century. Not surprisingly, he reports that his research efforts have received a very negative response from the fertilizer industry but expects those chemical firms with seed interests to take a closer look when the technology is more developed.

A HEART DRUG FROM POISON DART FROGS

Indians in Colombia and Ecuador use toxins found in rare so-called poison dart frogs on arrow tips to paralyze birds and game animals. Now researchers at the University of California (Irvine) are synthesizing analogs of those toxins for the treatment of heart disease, an endeavor that the National Institutes of Health is funding for $1.3 million over five years. The toxins — Dendrobatid alkaloids that are isolated from frog skin secretions — increase the force of heart muscle contraction. University of California researchers led by Larry Overman, a professor of chemistry, have thus fa synthesized 20 analogs of th toxins. Their goal is to develo an analog that, while not toxic will increase the force of hea contraction without increasin heart rate.

News from Japan

Prices of Major Chemicals Raised in Succession

Prices for staple chemical products have been revised upward one after another since last spring. Some of them were raised two, three on even four times after last fall. Market prices for almost all chemical products declined from the year before last year, in the wake of the yen's sharp appreciation and falling crude-oil prices.

Chemical producers are striving to beef up their poor business performances resulting from high raw-materials costs, taking into account that prices for crude oil and naphtha began to move up late last year. Behind this move is the fact that domestic demand for, in particular, consumer goods is steady, housing construction is at a high level, and market prices for chemical products abroad are rising sharply due to the tight supply-demand situation throughout the world.

Prices for petrochemical products have been noticeably raised since early this year, reflecting a reactionary rise of the naphtha price beginning in the July-September period of last year. Prices for pure benzene hit bottom in the same period. They were raised by Y5/kg in the October-December period of last year; Y6, 2 and 2/kg in each month of the January-March period, respectively; and Y15/kg in the April-June period. Producers are moving toward further raising of the prices in the July-September period. Such aggressive price hiking is coupled with increased demand for use in production of styrene monomer, caprolactam and phenol and the tight supply-demand situation for pure benzene itself.

Toluene/xylene producers increased product prices by Y5/kg last October and by Y15/kg last February. They proposed in late May to raise the prices by an additional Y15/kg. With this accepted by small-lot users, they are now negotiating with large-lot users for the price mark-up.

Methyl-ethyl-ketone prices were raised by Y15-20/kg last May, reflecting a bullish trend in international markets. Octanol prices were raised by Y15/kg last February and Y15-17/kg in the May-June period. n-Butanol producers upped product prices by Y15/kg last February due allegedly to the tight international supply-demand situation and high raw-material costs. Methanol prices were also raised by Y3/kg last May.

Price hikes for other chemical products are as follows: acetic acid, up Y10/kg in April and Y15/kg in June; etnyl acetate, up Y15/kg in June; ethyl acetate, up Y15/kg in May and Y20/kg in June; phenol, up Y20/kg in April and Y25/kg in June; aniline, up Y15-25/kg in April and Y20/kg in July; dioctyl phthalate, up a little less than Y25/kg in February and Y15/kg in June; vinyl chloride, up Y10/kg in mid-June; LDPE, PP and HDPE, up Y15, 15 and 20/kg, respectively, last spring (PP was raised another 20 percent after that); polystyrene, up Y15/kg in April and Y20/kg in July; styrene-butadiene-rubber, up Y30/kg in June; hydrochloric acid, up Y3/kg in March; and caustic soda (liquid), up more than Y5/kg (this price hike is still being debated between producers and users).

As shown above, derivatives prices have been raised successively on the grounds of increased raw material costs. Price-hike campaigns will spread to "downstream-sector" products from now on.

Joint Acetaminophen Production Slated :

Daicel Chemical Industries. Ltd, and Nippon Junryo Chemicals Co. have agreed to jointly produce acetaminophen — used as raw material for an antipyretic analgesic by combining their technology and products. The two companies will complete this August a 500-t/y plant by remodeling a versatile plant now under suspension at Nippon Junryo's factory. Daicel will be in charge of the marketing of the target product and promote market exploitation both at home and abroad, in particular Southeast Asia, by employing Mitsui & Co. as a sales agency.

They will construct large-scale mass-production facilities at Daicel's Aboshi factory within two of three years and put the product on the International market.

Daicel Chemical and Nippon Junryo are major producers of acetic anhydride and p-aminophenol, respectively. In general, acetaminophen is obtained through acetylation of p-aminophenol with acetic anhydride.

Acetaminophen is the most excellent analgesic in terms of costs, stability and side effect. If is extensively used as a cold remedy particularly in the U.S. and Europe. In Japan, demand for the product for use as an over the counter drug will show steady growth along with the partial amendment of the health insurance system.

An inflow of low-cost acetaminophen mainly from the U.S.

has moved into top gear amidst the yen's sharp appreciation. Mallinckrodt and Monsanto (both U.S.) have stepped up acetaminophen exports to Japan and has combined imports from abroad in the past one year reached about 100 tons, accounting for 1/6 of the country's annual demand. Prices for imported products are Y700-800/kg lower than those for domestic products.

Domestic acetaminophen makers are suffering from a fall in market price and low plant operation rates (60% on average), both of which have been triggered by the import of inexpensive products. The planned joint venture may result in the industry's reorganization.

Sumitomo Pharm. Forms Tie-up With U.S. Firm

Sumitomo Pharmaceuticals Co. announced the establishment in Tokyo of a firm to produce and sell in Japan popular medicine, including ulcer drugs, jointly with SmithKline Beckman Corp. (SKB), a U.S. drug and medical treatment equipment maker.

The announcement said the new firm, SmithKline Sumiyaku Pharmaceuticals Co., is capitalized at Y800 million and owned 60 percent by SmithKline and French Overseas Co. (SKF), a firm which handles overseas sales of popular medicine of the Philadelphia based, SKB, and the remaining 40 percent by Sumitomo Pharmaceuticals based in Osaka.

With an initial work force of 140, the new company is an amalgamation of their respective popular medicine sales divisions in Japan.

Scheduled to start operations on November 1, the new company also combines SKF's sales potential in Japan and Sumitomo Pharmaceutical's production development ability.

Initial year sales are targeted at Y10 billion.

M'bishi Chemical Builds 200,000-t/y PTA Plant

Mitsubishi Chemical Industries Ltd. recently announced that Matsuyama Kasei Ltd., its subsidiary, has completed construction of a 200,000-t/y plant for manufacturing high-purity terephthalic acid (PTA) and has put the plant into operation.

Since Matsuyama Kasei already had a 100,000-t/y PTA plant, the company's production capacity for PTA now totals 300,000 tons.

Furthermore, when the 270,000-t/y PTA plant at Mitsubishi Chemical's Kurosaki factory is added, the PTA Production capacity of those two companies aggregates 570,000 tons a year — second only to that of Amoco Chemicals (U.S.).

In addition, demand for PTA as raw material for polyester has been brisker than initially expected. Consequently, the new plant will be in full operation from the very beginning.

Polyester fiber, a major outlet for PTA, is increasing at the rate of 4-5 pecent a year through out the world.

Regarding demand for PTA for nonfiber uses such as PET film and PET bottles, PTA for use in VTRs and beverage bottles, etc., is increasing at the rate of around 10 percent a year. Thus, the supply-demand situation of PTA is becoming tight. In addition, there have been supply hindrances such as Pertamina (Indonesia)'s plant troubles.

Pacific Hydrogen To Make High-purity Hydrogen

Pacific Hydrogen Co., a joint venture among Showa Denko K. K. Lair Liquide SA (France) and Teisan Kabushiki Kaisha for manufacture and sales of ultrahigh-purity liquefied nitrogen, has completed construction of a 7,000-kl/y plant at the Showa Denko Oita complex and will put it into commercial operation shortly.

High-purity liquefied hydrogen has mainly been used for rocket fuel. It is now expected to be used for the semiconductor field. It has been commercialized with a view to strengthening the competitiveness of the Oita complex.

Pacific Hydrogen was established in August last year and is owned 60 percent by Showa Denko, 30 percent by Lair Liquide and 10 percent by Teisan.

The company is to manufacture liquefied hydrogen using hydrogen gas by-product gas in an ethylene plant. Since by-product gas is used, it is superior to other liquefied-hydrogen manufacturing methods in manufacturing costs.

Home Synthetic Dye Market Faces Substantial Change

The demand structure of synthetic dyes in Japan has changed substantially in the last several years. Domestic shipments of disperse dyes have continued dropping year by year since fiscal 1982, whereas those of reactive dyes have increased steadily, coming close to those of disperse dyes in FY 1986. If things continue like this, domestic reactive-dye shipments will surpass disperse dyes' by the end of this year.

This is attributed to the sharp drop in export of polyester textiles and the global boom in natural-fiber clothes. Companies mainly engaged in disperse dyes are facing difficulties.

Prior to the end of Japan's high economic growth, dyes manufacturers implemented capacity expansion one after another. Mitsubishi Chemical Industries was the first, followed by Nippon Kayaku Co. and Mitsui Toatsu Chemicals (Mitsui Badische Dyes). This pushed up the combined production of disperse dyes in Japan to 15,000 tons in 1973 from 8,000 tons. After that disperse dyes dominated the dye market particularly in terms of volume for a long time.

Their shipments began to drop several years ago and domestic shipments have continued decreasing by around 1,000 tons a year since then, in contrast to the rapid growth of reactive dyes. Though not so sharply as shipments, disperse dyes production has tends to drop in the periods, while reactive dyes maintained slow growth and jumped considerably from FY 1985 to 1986.

The export drop of polyester textile has resulted from the export drives of South Korea and Taiwanese countries in the Southeast Asian Market. In any case, the situation is a great disappointment to dyes makers who had high hopes that polyester business would continue booming. Some have intensified efforts for exports but are generally unsuccessful under the situation stemming from the high-flying yen. In the domestic market they are obliged to compete with low-priced Asian equivalents flowing in at a rapid pace.

Despite their all-out efforts gainst such moves, it seems invitable for the Japanese industry as a whole to cut back production or mothball production facilities to some degree. Some makers may even be obliged to retreat from this line in future.

Exclusive Licence Granted to Schering Plough

Schionogi & Co. has granted exclusive sales rights for its 3rd-generation oral cephem antibiotic "7432-S", for the world market to Schering Plough Corp. of the U. S. The product — an efficient antibiotic effective for a wide range of infections — has been developed following its 3rd-generation cephem antibiotic ("Shomarin") and 4th-generation one ("Flumarin").

Under the agreement, (1) Schering Plough has been granted exclusive sales rights for 7432-S for the world with the exception of Asian countries and nonexclusive sales rights for West Germany, East Europe and Oceania and (2) Shionogi keeps rights for selling the product in question together with the American firm in the areas for which the U. S. firm has obtained exclusive sales rights.

Schionogi will supply the product in bulk to Schering Plough 7432-S is particularly effective for Gram-negative bacteria, is very efficiently taken in by digestive organs and maintains a favorable level of blood concentration.

Nippon Kokan To Build Fine-ceramic Pilot Plant

Nippon Kokan K. K. will construct a pilot plant for mass production of Fine-ceramics adjacent to its central laboratory (Kawasaki City, Kangawa Prefecture).

The fine ceramics to be manufactured are highly hardwaring parts made from titanium diborate and high-temperature, high-strength parts made from sialon.

The company has been manufacturing both products at a small-scale plant and they have been included in the production of the company's steel production plant.

As a result, the company has set a high value on them.

Consequently, it has expanded the plant and will start delivering samples. At present the central laboratory is conducting R&D on fine ceramics.

With the cooperation of the laboratory, the company intends to commercialize the two types of products as soon as possible.

AGA BUILDS PLANTS IN SCANDINAVIA

Aga, the Swedish-based industrial gas group, has approved further expansion in the Nordic market through construction of two new air separation plants in Finland and Sweden.

The Finnish plant, which will be the largest in the country producing liquid air gases, is being built adjacent to Neste's plants in Skoeldvik, Borgaa region. Under the terms of an agreement between Aga and Neste, Aga will supply Neste's oil refinery, petrochemical unit and plastics plant with gaseous nitrogen. In addition, Aga will supply the merchant market in Finland with oxygen, nitrogen and argon. The plant is due for completion in 1989.

The Swedish plant will be constructed adjacent to the petrochemical industry in Stenungsund. Capacity of the new unit and the investment required will be determined during the autumn, with a final decision to be made in December. Aga's present air separation plant in Stenungsund was built in 1969 and is today the oldest of its type operated by the company.

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New Developments from Japan

Unique Process Aid For Improving L-LDPE Film Jointly Developed

Mitsubishi Corp. and Du Pont-Showa Denko Co. have jointly developed a new process aid for improving polyolefin films. In particular, it has, they claim, a significant effect on an L-LDPE film produced by blown film extrusion.

It is available in masterbatch form and when added to a resin in an amount equivalent to 1-2 percent of the resin, helps to greatly improve the quality of plastic films.

Processed L-LDPE is liable to have an uneven surface and reduced glossiness — a phenomenon called melt fracture when processing is conducted by users of conventional methods for eliminating the defects caused a decrease in films strength as well as increased production costs.

Use of the new process aid enables production of high-quality L-LDPE films at low cost with LDPE-use machines. The new aid is safe and has been approved for use in foodstuff-packing films. It will be marketed at Y-65 per kg. through Mitsubishi

Nissan Motor To Use Many Ceramic Car Parts

Nissan Motor Co. will employ many more ceramic parts for its auto engines in an effort to reduce the weight of mobile parts, increase output and rotating efficiency, and cut fuel costs. The company is tackling development of silicon-nitride-based components having tough abrasion/thermal resistance and excellent sliding properties.

In October, 1985, it started marketing "Fair Lady Z" sports cars equipped with ceramic (silicon nitride) rotors for turbochargers. It thus became the first company in the world to employ fine ceramics for mobile parts, though stationary ones had already been produced from them instead of from metal.

The ceramic rotor is 36 percent lighter than those produced from nickel alloy and its moment of inertia, as much as 45 percent lower than the latter's. In addition, compared with conventional products, it can shortern by 22 percent the time needed for attaining a given supercharging pressure. The company envisages expanding application of the ceramic rotor.

In April, 1985 it applied fine ceramics to manufacture of glow plugs and rocker-arm chips for diesel engine-mounted cars used as taxis.

In June this year it combined a ceramic (silicon nitride) rotor-incorporated turbocharger with a brand-new V-type 6-cylinder engine (2,000 cc) for its "Cedric" and "Gloria" cars. This ceramic rotor (exterior diameter: 55mm) is smaller and lighter than the equivalent (likewise, 62mm) for Fair Lady Z.

The company claims that ceramic engine parts have been approved by users, judging from the fact that it has already obtained many orders for ceramic rotor-equipped cars.

Superb Artificial-Bone Material Pioneered

Japan Fine Ceramics Co. and JGC Corp. have jointly developed an apatite hydroxide/zirconia ceramic under the guidance of researchers at Yamagata University.

The new product is used as material for artifical bone and is produced by mixing apatite hydroxide with ultrafine particles of zirconia and sintering the resultant product without applying pressure.

It has higher degrees of flexural strength and fracture toughness than natural bone. Compared with conventional artificial bone, it is clear to natural bone in terms of modulus of elasticity: the latter's value is three to four times higher than the former's.

It has been known for a long time that apatite — hydroxide ceramics — when used as artificial bone — have good compatibility with human bone but are inferior in dynamic properties. Due to this shortcoming, the products have been said unsuitable for bones supporting the weight of the human body.

DIC develop Polythioether Sulfone Resin

Using its original polymerization and compound technology, Dainippon Ink & Chemicals has developed a totally new super—engineering plastic "Amorvon" (PTES or polythioether sulfone). The new resin is obtained by adding crystallizing properties to a high — performance non — crystalline resin and has excellent high — temperature strength, mechanical properties, creep resistance, and flame resistance.

The company plans the construction of a plant with an annual production capacity of 250 tons within the bounds of its Kajima Plant and will start the supply of sample products of the glass — fiber reinforced engineering plastic in the near future. The company also plans to use PTES as the matrix for its pitch carbon fiber in the future and to enter the advanced fields centering on ACM, a stampable material.

Super ... engineering plastics currently available such as PPS, PES and PEEK have both strong and weak points, and users are demanding resins having mechanical properties, dimensional stability, chemical resistance, high — temperature strength, mechanical properties, and creep resistance.

About three years ago, Dainippon Ink & Chemicals constructed multi — purpose pilot plant on the site of its Sakai Plant to tackle research on sulfonic resins and has recently succeeded in the development of the super — engineering plastics with both crystallizing and non-crystallising properties that meet the needs of users.

PTES belongs to the new chemical substances designated by the law concerning the examination of chemical substances and production regulations. The company has already obtained approval for the production of this product and plans the construction, on the site of its Kajima Plant, of a plant with an annual production capacity of 250 tons. The new plant is scheduled to be completed within this month.

The glass — fiber reinforced resins using this PTES show a thermal deformation temperature of 240 to 260°C, which is higher than that for PES and PEI. Its mechanical strength is higher than that of conventional engineering plastics, with a tensile strength reaching 1,600kg f/cm^2 and an elastic modulus showing 13 X 10^4/cm^2. Even at high temperatures of around 150°C, it maintains more than 60 percent of its strength and rigidity shown at normal temperature and has other outstanding features in respect of dimensional change at high temperatures, linear thermal expansion coefficient, electric insulation, and mold shrinkage.

Dainippon Ink & Chemicals has already procured demand totaling around 100 tons centering on electronic parts such as concentrators, relays, and switches utilizing solderheat resistance, electric insulation, and precision moldability, and also on structural parts for VTRs and CD utilizing dimensional stability. After completion of the production facilities for base polymer, the company will promote the márketing of its new products on a full scale.

Nonpulverizable La/Ni-La Alloy For Hydrogen Storage Bared

The Japan Steel Works, Ltd., has developed a lanthanum/nickel-lanthanum eutectic alloy used as a hydrogen-storing alloy. The lanthanum/nickel phases of this alloy are lined up and due to this the alloy is not pulverized and maintains its original bulky form after repeatedly adsorbing/discharging hydrogen. These phenomena were confirmed through repeated tests on a piece (diameter : 10mm) of the alloy.

The new alloy's heat conductivity is higher than that of existing hydrogen storing capacity of the alloy, at the same level as that of existing ones by quantitatively controlling the nickel phases of the said alloy.

It has succeeded in producing the alloy by melting raw material alloy, cooling an edge of the resultant product so as to realize a temperature gradient therein, and solidifying it at given speed.

A potential application of the new alloy is as actuators. Production costs for the alloy are so high that it cannot be applied to a heat-pump system requiring a lot of hydrogen-storing alloy.

The hydrogen-storing alloy shows exothermic and endothermic reactions when absorbing and discharging hydrogen, respectively. These reactions can be applied to a heat pump. Lanthanum-nickel alloy has excellent hydrogen-absorbing/ discharging properties but has a defect in that it is pulverized and thereby clogs filters and its thermal conductivity using porous alumiused several ten times.

Government Industrial Research Institute, Osaka has microcapsuled hydrogen-storing alloy in an attempt to prevent its pulverization. Chuo Denki Kogyo Co. has tried to prevent reduction of the alloy's thermal conductivity using prosity aluminum.

Japan Steel Works is planning to test-produce calcium/nickel and magnesium/nickel alloys for hydrogen storage.

MITI to Aid Malaysia in Developing Palm Oil Tech.

The Ministry of International Trade and Industry (MITI) has declined to commission Engineering Advancement Association of Japan (EAAJ) with research on production technology for palm oil. The association will explain details of the commissioned project to its member companies. Ebara Corp. is most likely to be in charge of the project.

Malaysia has called on the Japanese government to collaborate in developing the said technology. MITI has been cooperating with developing countries in technology research in a bid to give support to their industrialisation.

More specifically, Japan provides funds and technology for commercialization of certain products proposed by developing countries in Southeast Asia and thereby helps them obtain foreign currency, promote employment and push forward industrilization.

COMPANY NOTES

Diamines declare dividend

Diamines and Chemicals Limited has reported very encouraging results for the year ended on 30th June, 1987 and Company's Directors have recommended a maiden dividend of 12% to its shareholders.

The gross profit has increased to Rs. 177.70 Lacs during the year as compared to Rs. 105.52 Lacs in the previous year. After adjusting depreciation arrears and carried forward loss and taxation the available surplus for appropriation stands at Rs. 28.29 Lacs out of which the Company has appropriated Rs. 22.18 Lacs for proposed dividend, Rs. 3.50 Lacs transferred to general reserve and balance Rs. 2.61 Lacs has been carried to Balance Sheet.

During the year under review, the Company has achieved production of 1509 M.T. against 1189 M.T. in the previous year registering 101% capacity utilisation. Similarly the Company's annual turnover for the first time crossed the Rs. 10 Crore mark and touched Rs. 1059 Lacs against Rs. 811 Lacs in the previous year showing an increase of 31% over last year. These improved results have come about in midst of constraints of steep increase in cost of raw-materials, power, coal, labour, utilities and other manufacturing and financial expenses etc.

The Company has made much progress in implementation of its plant for manufacture of 150 M.T. per year of Piperazine and its salts integrated with expansion/modernisation for increasing its existing production capacity up to 2150 M.T. per year in due course.

The Company has already approached Finnacial Institutions for the required financial assistance for these projects which is under their active consideration.

POLYCHEM OUTLOOK

Polychem Ltd which showed satisfactory results for the year March, 1987 and maintained the equity dividend at 25 per cent on the increased capital, has reported all round improvement in its working during the current year also. Production of all the items manufactured by the company have registered an increase during the five months ended August, 1987.

Sales in quantity and value during the five months have also been substantially higher over the first five months of last year. Total sales, net of excise during the period have been Rs. 26.70 crores against Rs. 20.62 crores in the same period last year.

According to Mr. Ramdas Kilachand, chairman, the company has applied for grant of letters of intent for styrene, polystyrene and copolymers as well as propylene oxide, propylene glycol, polyols and polyurethane foams in line with the minimum economic size for these products as downstream units of the proposed Gujarat Petrochemical complex. The government has not taken a final decision on setting up the cracker and the various downsteam units, though nearly two years have elapsed. The company is awaiting the sanctions of the government on these two projects based on its review representation.

Mr. Kilachand pointed out that steps were in progress to expand the ABS plant capacity from 200 tonnes per annum to 5,000 tonnes to implement the letter of intent to manufacture 200 tonnes per annum of polyvinyl alcohol; to modernise the styrene plant which will augment the capacity to 15,500 tonnes per annum. The company has also plans to expand the capacity of its VAM plant to 15,000 tonnes per annum. The estimated cost of all these projects is about Rs. 35 to 37 crores.

INDIAN RAYON

Indian Rayon and Industries, which suffered a modest setback in its working for the year ended June, 1987, but maintained the equity dividend at Rs 2.80 per share, is implementing several new diversification and expansion schemes.

Construction work on the 80,000 tonnes per annum white cement plant in Jodhpur district of Rajasthan is moving fast and nearing completion. The plant is expected to be commissioned by March, 1988. As a vertical expansion of the two insulator units, the company proposes to extend manufacturing facilities to include light-arrestors, condensor bushings, coupling capacitors and currrent transformers.

The company contributed Rs. 14.02 crores representing 8.5 per cent of the equity capital of Indo-Gulf Fertilisers and Chemicals Corporation. The new project entails the setting up of a gas based fertiliser plant for making 1,350 tonnes of ammonia and 2,200 tonnes of urea per day at Jadishpur in U.P. and the plant is expected to go on stream by middle of 1988.

The company has been selected a joint promoter of Mangalore refinery project, which is slated to have refining capacity of 13 million tonnes of crude per annum, to product LPG naphtha, motor gasoline and distillates. The project will also produce ethylene, propylene, butadiene and other related products. The estimated cost of the project is Rs. 1,050 crores. The project is being jointly promoted with Hindustan Petroleum Corporation. A memorandum of understanding to this effect is already signed.

NFL SET TO MAKE HUGE PROFITS

Despite the worst-ever drought in the country and a consequent fall in demand for nutrients, National Fertilisers Ltd (NFL) is set to achieve its production target for 1987-88 period.

NFL has set a profit target of Rs. 44 crores for 1987-88 against Rs. 25 crores during 1986-87.

Talking to a group of visiting newsmen at NFL, Panipat unit, the company's Managing Director, Mr. S. N. Jain, said the shortfall in demand during the current season would be adequately compensated during the coming rabi season when additional land would be available to farmers for cultivation.

Mr. Jain foresaw no threat to the overstocking of fertilisers as it would be able to release its products in the coming season. He ruled out competition from other companies as NFL had a strong hold over the market in north India.

There was no scope for discounts either as the Government had banned discount for fertiliser with effect from July 1.

However to boost its marketing in northern India, NFL has adopted strategies that include free soil testing for farmers and 'melas' in rural areas to make them aware of better farming techniques, Mr. Jain said.

To ensure continuous production and meet its energy requirements, NFL is installing two captive power plants of 15 mw each from Mitsui of Japan. The boiler drum of the Panipat plant had been lifted on September 16.

While the first plant is to be commissioned by the end of February 1988, the second plant is expected to be commissioned by the middle of next year.

This would help meet the plants' requirement of 25 mw power from its internal sources and eliminate dependence on the Haryana grid, which at present is supplying 28 mw to the Panipat unit, he added.

The Panipat unit of NFL has been maintaining a reasonably good performance since starting commercial production in September 1, 1979.

Spread over an area of 1,200 acres the Panipat unit produces 900 tonnes of ammonia, 1,550 tonnes of urea and 26.5 tonnes of sulphur per day, employing a total workforce of 1,180.

Fertiliser produced at the Panipat unit is marketed in Haryana, western UP, Punjab and Jammu and Kashmir, with nearly 50 per cent of the product being consumed within Haryana itself.

HPCL TO DIVERSIFY INTO PETROCHEM SECTOR

Setting up of grassroot refineries, rapid diversification in the petrochemical sector and further strengthening the existing resources are some of the highlights of the future programme envisaged by the Hindustan Petroleum Corporation Ltd.

Stating this at a news conference, Mr. M.K. Bagai, chairman and managing director, observed that the need of the hour was also, to undertake research and develop new products.

The corporation has prepared for the first time, a perspective plan-2005 which has identified several developmental projects. The investment under the plan could go beyond Rs. 5,000 crores, he added.

Some of the major projects under consideration include lube base stock augmentation facilities at the Bombay Refinery and a captive power plant at the Vizag Refinery. The Mangalore Refinery project will have the latest hydrocracker technology to maximise middle distillates, such as diesel oil and kerosene, in which the country is deficient.

The corporation has completed at Bombay a pilot plant involving development of indigenous technology for reduction of aromatic content in ATF produced from Bombay high crude. The corporation has also developed and introuced a multi-grade motor oil which will ensure petroleum conservation by extending the oil drain period.

Emphasising the question of energy management, Mr. Bagai said that the corporation had undertaken various capital projects. Six major projects costing Rs. 71 crores were under execution, which represents over 30 per cent of the total outlay under the plan projects. The savings, as a result, could be in the range of Rs. 20 crores.

Elaborating on the lube base stock augmentation facilities, he said that the project envisages setting up of facilities for manufacturing "Bright Stocks" and maximising the production of other high viscosity index. The total HVI production capacity would be enhanced by 144,000 tonnes per annum saving Rs. 28 crores in foreign exchange.

GUJARAT NARMADA FERTILISERS

The Gujarat Narmada Valley Fertilizers Company (GNFC) has recorded an all-time high both in production as well as sales during the year ended June, 1987.

According to the working results for 1986-87, the company has registered a record capacity utilisation of 92.62 per cent in ammonia plant production totalling 4.12 lakh tonnes. Methanol production was of the order of 21,806 tonnes registering a record capacity utilisation of 109 per cent and that of urea 103 per cent, with the total production of 6,10,176 tonnes.

The record production was achieved inspite of the severe drought situation and a glut in the fertilisers market. The company has also achieved a gross profit of Rs. 68.47 crores during the year with the net profit being Rs. 22.17 crores after providing for depreciation at Rs. 46.30 crores. The company has recommended a dividend of 18 per cent.

The total sales of fertilisers have increased from 8.70 lakh tonnes from last year's sales of 7.68 lakh tonnes an increase of 13 per cent. Similarly, the sales of methanol registered an increase of 18 per cent, that of liquid ammonia by 112 per cent and liquid nitrogen 37 per cent.

GNFC has achieved a 13 per cent improved turnover at Rs. 344.21 crores during the year as compared to the previous year's turnover of Rs. 304.46 crores.

FACT IN GOOD SHAPE TO FACE GLUT

A record profit of Rs. 42.70 crores made during 1986-87, the highest ever by the public sector Fertilizers and Chemicals Travancore Ltd., (FACT) has helped wipe off its accumulated losses in the fourth successive year of profitable operation.

Addressing a press conference after the 43rd annual general meeting of FACT, the Chairman and Managing Director,, Mr. N. B. Chandran, informed that the company had decided not to declare any dividend this year. After taxation of Rs. 1.25 crores and investment allowance of Rs. 5 crores, the profit carried over in the balance sheet is Rs. 36.45 crores.

Mr. Chandran disclosed that the proposed ammonia-urea complex of FACT at a cost of Rs. 383 crores was still hanging fire for want of Central clearance. He said that his information had been that the project had not been included even in the Eighth Plan so far.

Mr. Chandran replied to a query that FACT was ready to mobilise funds on its own from the non-resident Indians for the proposed complex which was inevitable for replacing the ageing plants at Udyogmandal provided the Centre gave the green signal. This had been brought to the notice of the Union Government, he added.

The FACT chief contended that the subsidy factor was in no way responsible for the good financial performance of the company.

Earlier addressing the annual general meeting, Mr. Chandran said that during the current year, production in the Udyogamandal and Cochin division were likely to be affected adversely by the 40 per cent power cut introduced since August last. Glut in the market was another factor.

During kharif and rabi this year, the consumption was expected to go down. Therefore FACT would have to curtail production to avoid stock accumulation and costs. Therefore the Chairman said that the results of the company for 1987-88 would not be encouraging.

The ammonium sulphate caprolactum plant which was nearing completion would be commissioned by the end of 1988, he informed.

Production in 1986-87, according to a release issued by FACT, surpassed all previous records. The sales turnover for the year recorded an all-time high of Rs. 300 crores.

MARKET INFORMATION

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and a seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

Dyes Intermediates up

The prices of some important dyes intermediates like cyanuric chloride, rhoduline and tobias acid had gone up in the Bombay dyes market during this week. Cyanuric chloride shot up to Rs. 125/-, tobias acid by Rs. 5/- and Rhoduline by Rs. 20/-. Dyestuffs had normal turnover.

In the chemicals section, chlorine based chemicals suffered for want of chlorine which was in short supply. There was some shortage in n-butanol also. Titanium dioxide continued to be in short supply. Other items however retained previous levels.

(Prices as on 24th September, 1987)

INDUSTRIAL CHEMICALS	Per kg.
Ammonium sulphate	2.00
Ammonium phosphate (Mono)	14.50
Ammonium phosphate (Di)	12.00
Ammonium carbonate (Di)	17.00
Ammonium bicarbonate	4.75
Ammonium chloride	5.75
Ammonium nitrate	4.50
Arsenic white powder	21.00
Acrylamide	58.00
Barium carbonate	6.00
Bleaching powder (33% Cl)	4.00
Borax (Granular)	14.00
Borax (Powder)	15.50
Boric acid (Tech.)	22.00
Bisphenol-A	60.00
Butyl carbitol	35.00
Caustic soda (Flakes)	7.00
Caustic soda (Solid)	7.75
Caustic soda (Lye)	6.00
Calcium chloride 70% (solid)	3.25
Calcium chloride 75-80% (fused)	3.50
Calcium chloride 96% (Anhydrous)	5.00
Calcium carbonate (PPT)	3.00
Calcium carbonate (Activated)	3.55
Camphor (Indian)	86.00
Cresylic acid	49.00
Cream of Tartar (Tech.)	64.00
Citric acid (Belgium)	41.00
Citric acid Indian	41.00
Copper sulphate	15.75
Chromic acid	40.00
Cyanuric chloride	95.00
Cobalt oxide	280.00
Carbitol	47.00
Dicalcium phosphate (Anhydrous)	16.00
Ferric chloride (Lumps)	5.50
Ethylene urea	56.00
Glue flakes	8.45
Glue sheets	6.75
Gohsenol GH	71.00

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Hyflosupercell	16+ST
Hexamine	29.00
Industrial Wax	25.00
Litharge	22.00
Lead Acetate (Tech.)	26.00
Lithopone	35.00
Magnesium chloride (crystal)	3.00
Menthol crystal (Flakes)	215.00
Menthol bold	235.00
Menthol crystal bold	375.00
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	15.00
Maleic Anhydride (per kg.)	50.00
Mercury (75 lbs)	5,500.00
Nickel chloride	49.00
Oxalic acid	21.00
Peppermint oil (Rectified)	100.00
Potassium carbonate (Indian)	19.00
Potassium carbonate (Imported)	21.00
Potassium bichromate	22.00
Potassium phosphate (Mono)	14.00
Potassium phosphate (Di)	14.00
Polyvinyl alcohol (No. 117)	88.00
Polyvinyl alcohol (No. 173)	90.00
Polyvinyl alcohol (No. 208)	89.00
Paraformaldehyde	15.00
Phthalic anhydride 96%	23.50
Pentaerythritol	63.50
Paraffin wax	13.75
Rangolite (German)	60.00
Rangolite (Czech.)	42.00
Sodium sulphate (Fine)	4.00
Sodium sulphate (Coarse)	3.80
Sodium sulphide 50-52% (Flakes)	8.25
Sodium sulphide 58-60% (Flakes)	9.25
Sodium sulphide pure (Flakes)	[illegible]
Sodium nitrite	12.90
Sodium chlorite 80% (Spain)	81.00
Sodium chlorite (50% span)	75.00
Santobrite (Indian)	36.00
Soda Ash (Tata)	3.85
Soda Ash (Birla)	3.50
Soda Ash (Imp.)	3.50
Sodium bicarbonate	5.50
Sodium bisulphite	4.50
Sodium silicate	3.00
Sodium acetate	6.40
Sodium alginate	160+ST
Titanium Dioxide (Anatase)	53+ST
Titanium Dioxide (Rutile — RCR_2)	62+ST
Tartaric acid (Crystal)	94.00
Trisodium phosphate	4.80
Thiourea	63+ST
Urea (Tech.)	2.60
Vacuum salt	1.00
Zinc Dust	30.00
Zinc Oxide	28.00
Zinc chloride powder (technical)	14.00
Zinc sulphate	4.20

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Acetic Acid (Glacial)	13.00
Acetic Anhydride	26.00
Acetone	20.50
Adipic Acid	50.00
Aceto Acetanilide	50.00
Aniline Oil	52.00
Benzoate Plasticiser	33.00
Butyl Acetate	42.00
Butyl stearate	36.00
Butyl Acrylate	59.50
Butanol	38.00
Benzyl chloride	24.00
Benzo trichloride	16.00
Benzoyl chloride	22.00
Benzyl Alcohol (FPC)	36.00
Bromine Liquid	45.00
Chloroform	24.50
Carbon Tetrachloride	10.75
Cyclohexanone	36+ST
Cyclohexanol	44.00
Diacetone	30+ST
Diethylene glycol (DEG)	31.00
Dioctyl Phthalate	48.50
Diallyl Phthalate	48.00
Dimethyl Phthalate	28.60
Dioctyl Adipate	52.00
Dibutyl Adipate	42.0
Dipentene	14.00
Dimethylamine 40%	12.00
Dimethylamine 60%	14.00
Ethyl Acetate	24.00
Ethyl Acrylate	46.00
Ethylene Dichloride	14.00
Ethylene Glycol	22.00
Formic Acid (Imp.)	30.50
Formaldehyde	5.75
Glycerine (CP)	50.00
Glycerine (IW)	49.00
Hydrogen peroxide 50%	25.50
Iso Propyl Alcohol	18.50
Iso Butyl Alcohol	28.00
Monoethanolamine	46.50
Morpholine (Indian)	65.00
Melamine	36.00
Methyl Ethyl Ketone	31.50
Methyl Isobutyl Ketone	34.00
Methyl Acrylate	42.00
Methylene Dichloride	21.50
Meta Cresol	45.00
Nitrobenzene	16.50
Nitric Acid (Con.) (RCF)	2.50
Ortho Cresol	32.00
Phenol	36.00
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Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
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SOLVENTS	Per Litre
Benzene	8.25
N-Heptane	8.00
N-Hexane	8.75
Methanol	6.75
Solvent Naphtha Heavy	9.50
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Toluene	10.30
Xylene	12.00

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Alphanaphthylamine	54.00
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Ammonium Molybdate	170.00
Anthraquinone	80.00
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2-Amino-4-Nitrophenol (Imp.)	140.00
Blue B. Base (Local)	235.00
Beta Naphthol (Atul)	58.00
Benzidine Dihydrochloride (BDH)	66.00
Bromamine Acid	400.00
BON Acid	112.00
Chicago Acid	275.00
C. Acid (Imp.)	260.00
Coach Acid	58.00
Cyanuric Chloride (Japan)	125.00
2, 4, DNCB	26.00
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Dimethyl Aniline	52.50
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Di-amino stilbene disulphonic Acid	115.00
3, 3-DCB (Imp.)	155.00
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Bombay Dyes Markets

(Prices as on 24th September, 1987)

ACID COLOUR	Per Kg
Acid Violet 4BS	143.00
Acid Maroon V	110.00
Acid Orange II	77.80
Acid Orange IIY	63.05
Acid Red A	107.25
Crosein Scarlet MOG	155.00
Acid Scarlet 3R	99.90
Acid Red 38N	135.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Green V	330.00
Acid Patent Blue AS	250.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	121.95
Acid Black BX	98.40
Acid Black Wax	135.50
Procinil Yellow GS (I.C.I., UK)	265.00
Procinil Red GS (I.C.I., UK)	530.00
Procinil Blue RS (I.C.I., UK)	315.00
Procinil Scarlet G (I.C.I., UK)	600.00
Procinil Orange G (I.C.I., UK)	250.00
Procinil Rubine (I.C.I., UK)	550.00

DIRECT COLOURS	Per Kg
Yellow 3GX	88.10
Sun Yellow RCH	124.40
Fast Yellow GCH	141.15
Yellow CFG Hly. Conc.	312.00
Fast Yellow GS	111.65
Fast Yellow CHRS	95.45
Viscose Orange A	166.15
Fast Orange GR	133.75
Red	96.90
Dark Tan	78.25
Red IIR	72.55
Red 4B	169.10
Bordeaux BW	132.30
Fast Scarlet 4BS	166.55
Red 12B	170.55
Bordeaux Hly Conc.	194.00
Cotton Red N	117.05
Brill. Fast Helio B	278.00
Brill. Fast Helio 2B	297.00
Brill. Fast Helio 2RS	136.20
Brill. Fast Helio BS	116.10
Brill. Violet Extra	126.40
Blue 2B	86.60
Blue G	170.50
Sky Blue FB	188.25
Copper Blue GR	147.00
Fast Greenish Blue GL	114.60
Developed Black BT	116.10
Blue NB-2B	300.20
Blue NB-2BC	185.30
Developed Black NB-BH5	185.30
Green B	111.65
Green NB-B	188.25
Green 2B-N	188.25
Brown MR	154.40
Brown CN	107.25
Golden Brown G	140.35
Catechin G	120.50
Omega Tan	126.40
Catechin GS	102.80
Black E Hly Conc.	142.60
Black E Extra Hly Conc.	142.60
Black NB-ER Hly. Conc.	310.50

DISPERSOL COLOURS	Per Kg
Yellow 6G Powder	143.80
Red B 3B Powder	247.80
Red B 2B Powder	323.20
Red CB Powder	439.15
Red D2B Powder	477.40
Violet C 4R	521.90
Blue BG Powder	235.45
Blue BN Powder	103.75
Blue D 2R Powder	476.25
Navy BT Powder	243.90
Blue B 2G Powder	210.20
Black BT Powder	182.60
Blue BR Powder	390.20
Yellow 7GL	338.60
Yellow 5RX	218.80
Yellow 3G	367.25
Yellow	140.00
Yellow AL	135.30
Yellow Brown REL	247.50
Yellow FFL	463.60
Gold Yellow GG	259.70
Pink REL	247.00
Red REL	468.65
Red 2B	327.40
Red FB	324.20
Red Violet FBL	469.85
Orange 3R	196.65
Violet 3R	280.60
Violet 6R	485.75
Violet RL	275.4
Scarlet RR	214.8
Rubine 3B	223.0
Rubine CB	364.9
Blue GL	318.9
Blue BGF	636.5
Navy Blue RE	270.4
Brown 3REL	200.4
Black GEL	324.2
Dark Brown 3B	317.4

BASE COLOURS	Per Kg
Fast Yellow GC	80.2
Fast Orange GC	135.45
Fast Scarlet R	166.80
Fast Scarlet RC	126.65
Fast Scarlet RCR	99.05
Fast Scarlet G	121.65
Fast Scarlet GN	91.50
Fast Scarlet GG	72.70
Fast Scarlet GGS	72 70
Fast Red B	203.20
Fast Red RC	119.15
Fast Red R Flakes	149.25
Fast Red TR	166.80
Fast Red TR Oil	183.15
Fast Red RL	237.10
Fast Red KB Oil	201.95
Fast Bordeaux GP	201.95
Fast Garnet GBC	94.05
Fast Violet B	505.60
Fast Blue BB	521.45

NAPHTHOL COLOURS	Per Kg
ASG	217.00
AS	143.00
ASSW	279.75
ABBS	188.15
ASBO	195.65
ASD	175.60
ASOL	179.35
ASTR	279.75
ASPH	279.75
ASE	196.05
ASEI	184.40
ASLB	1632.60
ASBT	1817.00
ASWG	143.00
ASSG	397.70
ASSR	480.50

PROCION COLOURS	Per Kg
Golden Yellow HR	181.80
Brill. Yellow H 4G	117.55
Supra Yellow H-8GP	168.55
Brill. Yellow HE6G	166.95
Yellow H-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	243.95
Yellow M GR	326.05
Brill. Yellow M 4G	177.10
Brill. Yellow M 8G	332.30
Yellow M 3R	217.60
Brill. Orange H 2R	241.85
Brill. Orange M 2R	313.15
Brill. Red H 7B	157.95
Brill. Red H 8B	169.45
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.30
Brill. Red H-F3B	243.45
Brill. Magenta HB	167.00
Brill. Red M 5B	98.90
Brill. Red M 8B	173.70
Brill. Pink MB	137.10
Brill. Magenta MB	121.55
Brill. Purple H-3R	180.20
Brill. Purple H-7R	175.40
Navy Blue H 3R	298.50
Brill. Blue H-GR	366.55
Brill. Blue H 5G	173.10
Blue H 5R	283.85
Brill. Blue H 7G	178.70
Brill. Blue H 7RX	358.15
Turquoise HA	234.45
Supra Blue H-3RP	335.70
Supra Turquoise H 2GP	181.50
Blue H-ERD	305.80
Navy Blue H ER	258.60
Blue H 5RX	269.30
Navy Blue M 3R	310.95
Brill. Blue MR	331.70
Brill. Blue M RX	214.20
Brill. Blue M-G	382.30
Blue M 4GD	344.60
Navy Blue M RB	318.75
Turquoise M-G	197.85
Brill. Blue M GX	302.50
Blue 3R Acra Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg)	285.00
Green H 4BD	269.80
Green H-E4BI	169.80
Red Brown H 1F	143.25
Orange Brown H 2B	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS	Per Kg
Navy Blue	99 85
Green G	198.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI)	Per Kg
Yellow 5G Powder Fine	673.15
Yellow 5G Supra Disperse	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr Fine	624.35
Gold Orange 3G Supra Disp.	570.30
Brill. Orange 6R Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disc.	713.20
Brill. Purple 4R Conc Powder	470./5
Brill. Purple 3R Acra Powder	696.85
Brill. Purple 2R Hly Conc.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Conc.	625.95
Blue R Powder Fine	542.15
Blue BC Conc Pdr. Fine	522.50
Blue BC Acra Conc Pdr. Fine	762.70
Blue R Conc Pdr. Fine	577.65
Blue RR Supra Powder	629.35
Blue Conc Powder	645.80
Brill. Blue 2R Hly Conc	378.55
Brill Blue 2R Supra Disp.	115.65
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Pdr.	823.95
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Pdr. Fine	419.65
Jade Green 2G Ptg. Paste	125.40
Olive Green B Pdr. Fine	399.90
Olive Green B Supra Disp.	308.25
Jade Green 2G Supra Disp.	496.00
Jade Green XBN Supra Disp. (N)	327.30
Olive D Pdr. Fine	444.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp.	536.05
Olive R Pdr. Fine	422.95
Olive R Supra Disp.	363.90
Olive D Supra Disp.	361.70
Olive D Ptg. Paste	193.00
Olive Green B Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc	640.00
Olive Green B Acra Conc	542.75
Brown R Pdr. Fine	835.00
Brown G Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
Dark Brown 3R Pdr. Fine	685.00
Brown G Supra Disp.	449.90
Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.55
Brown G Acra Conc	733.95
Brown R Acra Conc	766.00
Grey M Powder Fine	768.80
Grey M Supra Disp.	585.45
Blue BC Acra Conc Pdr. Fine	762.70
Direct Black AC Pdr. Fine	474.70
Direct Black AC Supra Disp.	330.35
Direct Black CH Supra Disp.	393.20
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI : SEPT. 25 (NNS) — Titanium dioxide rose sharply by Rs. 1/3 per kg. in the local chemicals market during past week in the absence of fresh inflow from Kerala coupled with sustained demand by paint manufacturers. Paraffin wax and refined wax also increased by Rs. 10/15, while ammonia bicarb fell sharply by Rs. 14 per 25 kg. Turnover was normal.

Titanium dioxide Anatase recorded a sharp rise of Rs. 3 at Rs. 53.50 per kg. on heavy seasonal consumption as well as paucity of supply from Kerala. Titanium dioxide RC. 822 advanced further by Re. 1 at Rs. 58 on increased mutual speculation. Higher Bombay advices also aided the market sentiment.

Paraffin and refined wax jumped up sharply by Rs. 30 each at Rs. 625 and Rs. 725 in the absence of inflow from Assam coupled with increased demand by candle manufacturers, but at the weekend increased arrivals of 4 trucks of actual users quota in the market it reacted downward and traded at Rs. 610 and Rs. 700. In the absence of import from Spain, France and Italy, Tartaric acid (French quality) hardened by Rs. 100 at Rs. 6100 per 50 kg. Citric acid ruled static at Rs. 2,050/210 on reduced inflow.

Menthol medium and bold hardened from Rs. 175 and Rs. 185 to Rs. 180 and Rs. 187 per kg. due to fall in arrivals from producing mandis of U.P. coupled with better demand by consumers. Menthol flake recovered by Re. 1 at Rs. 164. Mentha oil ruled static at Rs. 125.

Ammonia bicarb suffered a sharp of Rs. 14 at Rs. 148 per 25 kg. on dehoarding tendency by stockists in hope of increased offerings. Camphor that decreased by Rs. 3 at Rs. 102 at slack demand at higher level. Sodium nitrite moved down by Rs. 10 on poor enquiries.

Napthalene balls lost Rs. 25 at Rs. 1,025 on reduced demand. Dyes and colours remained unchanged.

(DELHI MARKET RATES AS ON SEPTEMBER 25, 1987)

Ammonia Bicarb (per 25 kg.)	148.00
Mercury (per flask)	6,600.00
Soda ash (per bag)	268-280.00
Ammonium Chloride (per 50 kg.)	110-180.00
Caustic Soda solid (per 50 kg.)	355.00
Caustic soda flakes (per 50 kg.) ,	338.00
Citric acid (per 50 kg.)	2050-2150.00
Stable Bleaching Powder Shriram (per 25 kg.)	89.00
Stable Bleaching Powder KCI (per 25 kg.)	83.00
Stable Bleaching Powder MODI (per 25 kg.)	87 00
Sod. Bicarbonate (per 50 kg.)	245.00
Sod. Hydro Sulphite (per kg.)	30.50-33.50
Rangolite (per kg.)	37.50-60.00
Boric acid Technical (per 50 kg.)	1,000.00
Paraffin wax (per 50 kg.)	610.00
Tartaric acid (per 50 kg.)	6,100.00
Borax Granular (per 50 kg.)	520.00
Borax Crystal (per 50 kg.)	550.00
Sodium Nitrite (per 50 kg.)	640.00
Sodium Nitrate (per 50 kg.)	410.00
Camphor Thal (per kg.)	102.00
Camphor Powder (per kg.)	90.00
Menthol Bold (per kg.)	187.00
Menthol flake (per kg.)	164.00
Menthol medium (per kg.)	180.00
Glycerine (per kg.)	45-55.00
Sodium Silicate (per quintal)	300.00
Hexamine (per kg.)	24.00
Acetic Acid Glacial (per kg.)	14.50-18.00
Copper Sulphate (per quintal)	1,500-1,800.00
Formic acid (per kg.)	32-33.00
Formaldehyde (per kg.)	5.50
Hydrogen Peroxide (per kg.)	28.00
Calcium Carbonate (per Tonne)	2,500-4,000.00
Acid Slurry Soft (per kg.)	25.00
Acid Slurry Hard (per kg.)	32.00
Phosphoric Acid (per 50 kg.)	810.00
Pot. Nitrate (per quintal)	850-1,200.00
Pot. Permangnate (per 50 kg.)	2,400.00
Sod. Bichromate (per 50 kg.)	1,025-1,125.00
Tri-sod. Phosphate (per 50 kg.)	310-330.00
Titanium Dioxide Anatase (per kg.)	53.50
Titanium RC-822 (per kg.)	58.00
Zinc Oxide (Per Metric Tonne)	28,500-32,500.00
Phenol Carbolic Acid (per kg.)	28.00
Carbon Tetrachloride (per kg.)	16.50
Chloroform (per kg.)	26.00
Sodium Sulphate (per Metric Tonne)	3,100-3,200.00
Napthalene Balls (per 50 kg.)	1,025.00

DYES & COLOUR	Per Kg.
Napthol AS	140.00
Napthol ASG	215.00
Napthol ASBS	192.00
Napthol ASTR	295.00
Napthol ASOL	176.00
Napthol ASBO	198.00

DIRECT DYES	Per Kg.
Black E. Conc.	92-150.00
Diazo Black B.T.	120.00
Green B.	115.00
Blue 2-B	86.00
Sky Blue FB	186.00
Basic Auramine 'O' Conc.	55-100.00
Basic Rhodamine B. 500%	220-300.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

Bombay Drugs Markets

(Prices as on 24th September 87)

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such, they are not FIRM PRICES as between a buyer and a seller. The prices are published only with a view to giving some idea of market conditions.

Product	Rs. per kg
Acetazolamide I.P.	700.00
Acriflavine B.P.C.	800.00
Aluminium Hydroxide I.P.	21.00
Ampicillin Trihydrate	2,000.00
Aspirin I.P.	62.50
Barium Sulphate	19.90
Belladona Extract	74.50
Benzoic Acid I.P.	31.40
Caffeine Citrate I.P.	205.00
Caffeine I.P.	350.00
Calcium C.M.C.	98.00
Calcium Gluconate I.P.	41.00
Calcium Glycerophosphate	141.00
Calcium Hypophosphate B.P.C.,	108.00
Calcium Phenthonate	450.00
Calomel B.P.	330.00
Cetrimide I.P.	215.00
Chloroquine Phosphate	500.00
Choline Chloride FG	33.00
Choline Chloride I.P.	70.00
Citric Acid I.P.	42.00
C.M.C. Sodium HV	85.00
C.P. Maleate I.P.	945.00
Dapson I.P.	375.00
D. C. Citrate	235.00
Dexamethosone	75.00
Diastase (1 : 50)	58.00
Diazepam I.P.	615.00
Di Iodo Hydrin	335.00
Diloxanide, Fumarate I.P.	400.00
Di Phenyl Hydrogen Citrate	198.00
Di Sodium Hydrogen Citrate	43.00
D-Panthenol Liquor	550.00
Ergomatrine Maleate	165.00
Ethambutol I.P.	650.00
Ferrous Fumarate	35.00
Folic Acid I.P.	4000.00
Furosemide I.P.	1,210.00
Furazolidone I.P.	360.00
Gentamycin Sulphate	9.20
Gum Acacia	57.00
Gum Acacia White	95.00
Gum Guar	16.00
Hematropine Methyl Bromide	9.25
Ibuprofen I.P.	345.00
I.N.H.	222.00
Inositol I.P.	560.00
Iodochloro	320.00
Iodoform NF	540.00
Lactose I.P.	28.00
Lactose Tech.	25.00
Lactic Acid	68.00
Lignocaine HCL	255.00
Lignocaine Base	255.00
L. Lycine Feed	135.00
L. Lycine Pharma	187.00
Magaldrate I.P.	51.00
Magnesium Carbonate I.P.	15.00
Magnesium Hydroxide NF	20.50
Magnesium Hypophosphate	125.00
Magnesium Trisilicate I.P.	11.50
Mannitol USP	64.00
Mercurochrome NF	270.00
Menthol	190.00
Metronidazole I.P.	415.00
M.P.S.	142.00
Niacinamide	143.00
Oil Mentha	60.00
Oxyphenbutazone	513.00
Papaine BPC	53.00
Paracetamol	97.00
Pectine I.P.	233.00
Pepsin 1:3000	450.00
Pheniramine Maleate	730.00
Phenyl Butazone USP	255.00
Potato Starch	65.00
Rifampicin I.P.	2,900.00
Saccharine Sodium	205.00
Salbutamol Sulfate	8.25
Sodium Hypophosphite ,	125.00
Sodium Salicylate	61.00
Sorbitol Powder	95.00
Sorbitol USP	17.25
Sulfacetamide	268.00
Sulphamethoxazole	415.00
Tinidazole	378.00
Trimethoprim I.P.	820.00
Vitamin A. Palmitate	2,650.00
Vitamin B_1 Hydrochloride	1,550.00
Vitamin B_1 Mononitrate	1,700.00
Vitamin B_2	2,500.00
Vitamin B_6 Hydrochloride	1,800.00
Vitamin B_{12}	100.00
Vitamin B_2 5-Phosphate	2,900.00
Vitamin C Plain	238.00
Vitamin C Coated	248.00
Yeast Powder	24.00
Vitamin K_3 W/S	776.00

MATERIALS IMPORTED

BOMBAY
(From 21.9.87 to 25.9.87)
(Cost of Imported Item is CIF Value)

ALLYL CHLORIDE : From Japan : NND Products, 2,160 kgs., Rs 42,147.

AMINO METHYL PIPERAZINE : From Japan : Themis Chemicals Ltd., 200 kgs., Rs. 1,47,192.

AMPICILLIN SODIUM STERILE : From Italy : Rodson Labs. P. Ltd., 50 kgs., Rs. 67,786.

AMPICILLIN TRIHYDRATE IP/BP : From USA : Lyka Labs. Ltd, 450 kgs., Rs. 4.18.334.

AROMATIC CHEMICALS : From USA : FFC Aromas P. Ltd., Rs. 58,831.

ARSENIC TRIOXIDE : From China : Abdullabhai Abdulkadar, 17,000 kgs., Rs. 1,07,552.

BIOCHEMICALS : From West Germany : Boehringer Knoll Ltd., 1 kg., Rs 2,955.

CALCIUM PANTOTHENATE USP : From West Germany : Chemicolours Inds. Ltd., 200 kgs., Rs. 56,955.

CARBAMEZEPINE BP : From Italy : Torrent Exp. P. Ltd., Ahmedabad, 110 kgs., Rs. 2,07,383.

CHLORAMPHENICOL : From Italy : Sumedha Chemicals, Indore, Rs. 5,29,374.

CHLORAMPHENICOL SODIUM SUCCINATE :From Spain: Lyka Laboratories, 300 kgs., Rs. 2,55,649.

CITRIC ACID : From China : Dyes Distributors India Ltd., 5,000 kgs., Rs. 67,786; 5,000 kgs., Rs. 67,786.

CLOXACILLIN SODIUM ORAL : From Singapore : Biochem Pharma P. Ltd., 100 kgs., Rs. 1,09,748.

CLOXACILLIN SODIUM STERILE BP : From Singapore : Unichem Labs. Ltd., 50 kgs., Rs. 80,697.

CYANURIC CHLORIDE : From Japan: MHP Chemical Inds., 500 kgs., Rs. 21,014.

CYCLOHEXANONE : From Netherland : Dhirajlal & Co., 9,000 kgs., Rs. 1,20,588; 9,000 kgs., Rs. 1,20,588.

DEXAMETHASONE BASE : From USA : F.D.C. P. Ltd., 2 kgs., Rs. 71,014.

DEXAMETHAZONE SODIUM: From France : Cadila Labs., P. Ltd., Ahmedabad, 5 kgs., Rs. 1,93,673.

DEXCHOLRPHENIRAMINE MALEATE : From Ireland : Fulford India Ltd., 60 kgs., Rs. 9,76,114.

ERYTHROMYCIN THIOCYANATE : From USA : British Pharma, 252 kgs., Rs. 2,55,092.

FOLIC ACID BP : From Japan : Bombay Drugs House Ltd., 105 kgs., Rs. 1,73,039.

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HEXACHLORETHANE From UK : Pharmaken, 5,400 kgs., Rs. 62,402.

HIGH DENSITY POLYETHYLENE : From Yugoslavia : Fortune Agencies, 15,000 kgs., Rs. 1,36,177.

HYDROCORTISONE ACETATE : From USA : Roussel Pharmls. Ltd., 15 kgs., Rs. 12,888.

HYDROXY PHENYL GLYCINE : From Holland : Sarabhai Chemicals, Baroda, 300 kgs., Rs. 90,964.

ISOBUTYL ALCOHOL : From Holland : N. K. Ravani, 12,480 kgs., Rs. 81,895; 12,480 kgs., Rs. 81,895; 12,480 kgs., Rs. 81,895; 12,480 kgs., Rs. 81,895.

ISO OCTYL THIO GLYCOLATE : From France : Dura Chemicals Corpn. P. Ltd., NA kgs., Rs. 45,232.

LABORATORY CHEMICALS : From Switzerland : K. Raj & Co., 100 kgs., Rs. 29,157.

LINCOMYCIN : From USA : Menezes Remedies, Panjim, 175 kgs., Rs. 7,35,958.

LINEAR ALKYL BENZENE- From USA : Sonal Inds., Ahmedabad, 25,000 kgs., Rs. 2,41,123.

LITHIUM SULPHATE : From USSR : Chemical De Universal Ltd., 75 kgs., Rs. 2,907.

LOW DENSITY POLYETHYLENE : From USSR : Nikon Corporation, 13,500 kgs., Rs. 89,725.

LOW DENSITY POLYETHYLENE : From USSR : Nisha Chemical, 13,500 kgs., Rs. 89,725; 3,500 kgs., Rs. 89,725; 13,500 gs., Rs. 89,725.

NALIDIXIC ACID : From Italy : Torrent Exp. P. Ltd., Ahmedabad, 125 kgs., Rs. 1,12,329.

PARACHLORO TOLUENE : From West Germany : Coastal Blue Chemicals, 3,000 kgs., Rs. 79,646.

PARA TERTIARY BUTYL PHENOL : From Japan : Indo Marine Agencies P. Ltd., 2,500 kgs., Rs. 42,277.

POLYVINYL ALCOHOL : From Japan : Ashish Dye Chem, 1,000 kgs., Rs. 19,776; Impex Trading Corpn., 4,000 kgs., Rs. 79,103.

POTASSIUM CARBONATE : From France : Navin Fluorine Inds., 18,000 kgs., Rs. 1,33,735.

PREDNISOLONE IP : France: Hoechst India Ltd., 45 kgs., Rs. 5,22,918.

PROPYLENE GLYCOL : From USA : Rallis India Ltd., 8,600 kgs., Rs. 89,498; 4,300 kgs., Rs. 43,965; 8,600 kgs., Rs. 89,498.

PYRAZINAMIDE : From Italy : Alembic Chemical Works, 350 kgs., Rs. 1,98,418.

RANITIDINE HCL : From Spain : Vital Organics, 150 kgs., Rs. 3,87,611.

SODIUM SILICATE: From UK: TELCO, 420 kgs., Rs. 14,105.

TRIMETHOXY BENZALDEHYDE : From Holland : Alex & Rogers, Ahmedabad, 525 kgs., Rs. 1,62,034.

TRIMETHYL PHOSPHATE : From West Germany : Sudarshan Chemical Inds. Ltd. 14,400 kgs., Rs. 3,97,883.

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- Di Potassium Phosphate.
- Tetra Sodium Pyro-Phosphate.
- Tetra Potassium Pyro-Phosphate Crystal Tech./IP.
- Tri Magnesium Phosphate.

- Sodium Acetate Crystal IP.
- Sodium Acetate Anhyd./IP.
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- Sodium Phosphate Crystal IP.
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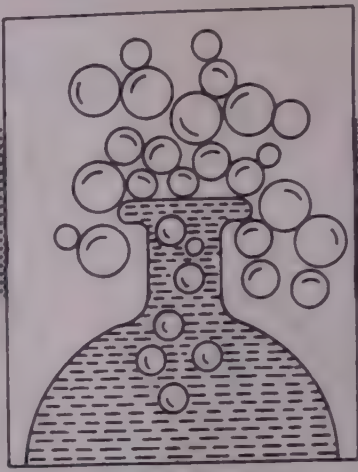

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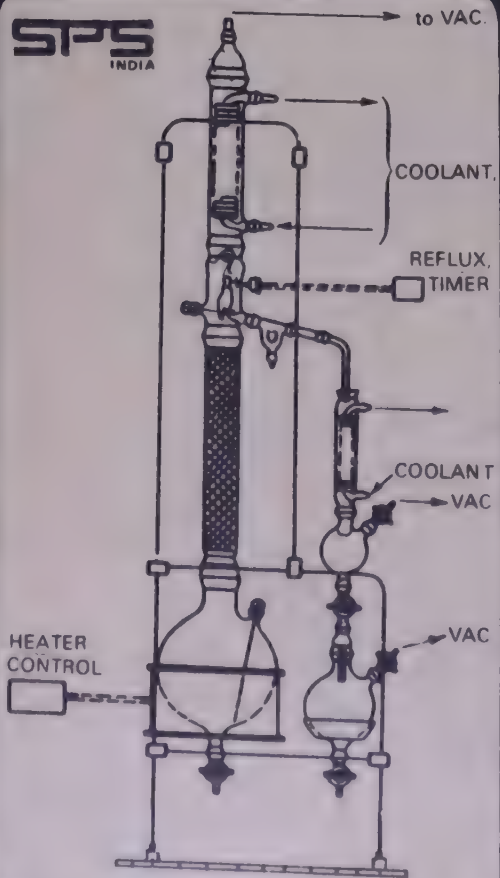

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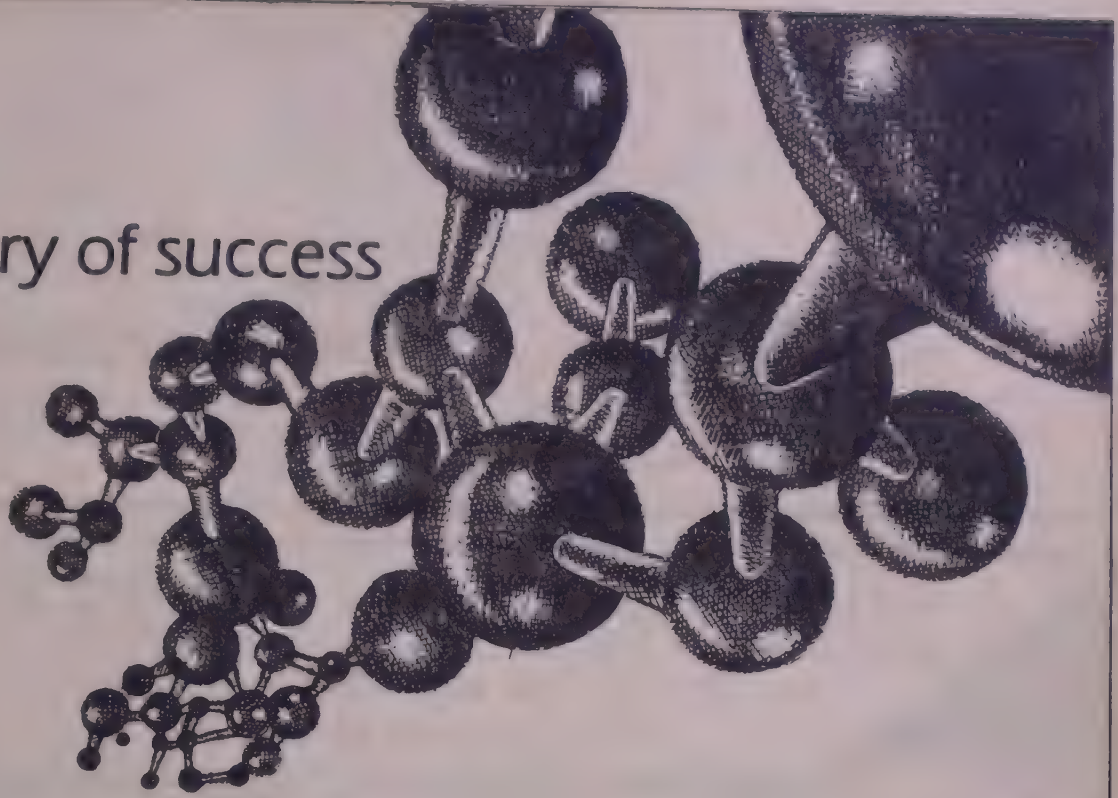

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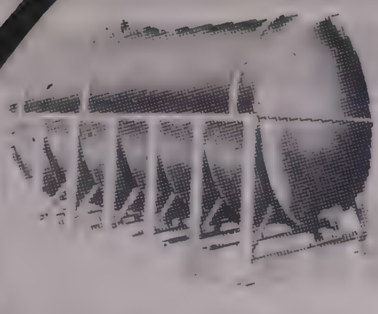

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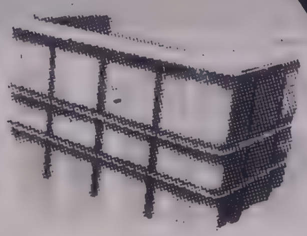

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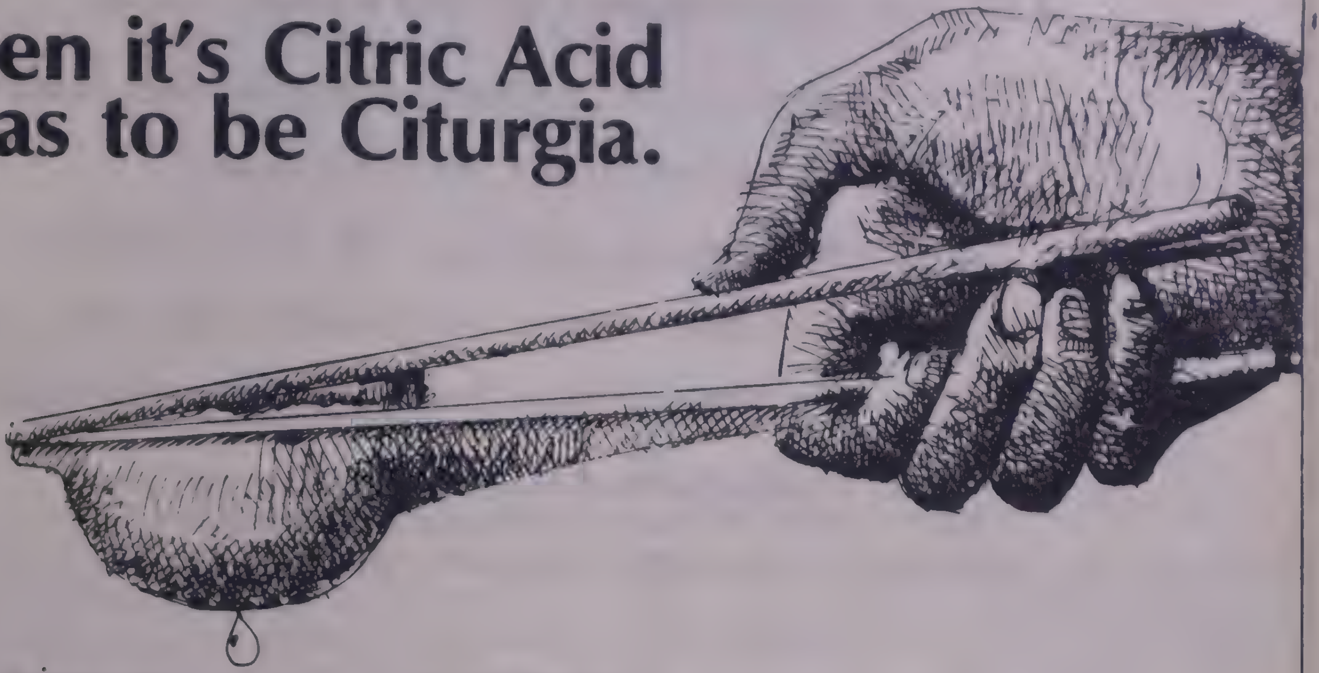

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CHEMICAL
WEEKLY

VOL. XXXIII OCTOBER 13, 1987 NO. 4

Cobalt and the Wealth on the Ocean Floor

Roughly half the earth is covered by deep ocean, and sizeable portions of its floor are littered with nodules. The richest nodule deposits are found in the Central East Pacific and the Central Indian Ocean. The world's oceans contain an estimated 1,600,000 million tonnes of nodules. On an average, they contain 25 per cent manganese, 1.5 per cent nickel, 1.2 per cent copper and 0.2 per cent cobalt. At today's price, one million tonnes of nodules will produce $170 million worth of these metals.

The potato-sized manganese nodules, rich in copper, cobalt, nickel, iron and manganese, cover an area of over 10 million sq. km. of the Indian ocean, like a carpet on the sea floor. In the two years ending March 1984, India had spent over Rs. 14 crores on the seabed survey of manganese nodules. the survey was carried out by the National Institute of Oceanography (NIO) in four vessels, the Indian-built R.V. 'Gaveshani', the 40 crore 'Sagar Kanya' acquired from West Germany, and two chartered ships from Norway and Finland.

Samples of nodules dredged from the proposed mining site have been analysed by six different research institutes in the country. At the Regional Research Laboratory in Bhubaneshwar, scientists have extracted nickel, cobalt and copper in laboratory scale operation. A million tonnes of these nodules will produce 60,000 tonnes of manganese, 15,000 tonnes of nickel, 14,000 tonnes of copper and 2,000 tonnes of cobalt. The total value of these metals is over Rs. 1.5 billion.

Cobalt is a tough silvery white metal with properties much like nickel. It is heavier and stronger than iron and does not tarnish. It forms a mere 0.00001 per cent of the earth's minerals. It is generally mixed with copper, silver, iron, nickel, lead, zinc and arsenic to such an extent that extracting it poses problems.

Cobalt takes its name from the mythical "Kobolds", underground gnomes who troubled miners until prayers were held in churches to free miners from their malicious influences.

The biggest present use of cobalt is in the alloys used for high speed cutting tools to resist heat and wear. Steelite, an alloy of cobalt, chromium and tungsten used in these tools, accounts for almost 40 per cent of the total cobalt produced in the world. Steelite is harder than steel even when it gets red hot.

Cobalt's toughness gives it other industrial importance. The cemented carbide dies used in the cold drawing of metal bars and wires contain cobalt. The turbine blades of jet planes contain alloys that become red hot, but still do their job. Cobalt toughens gun barrel linings, and a cobalt copper alloy takes the beating given to hubs of aircraft propellers.

The other important use of cobalt is in permanent magnets. These are at the heart of TV and radio loud speakers and are also in the generators of army tanks and airplanes.

Radar also calls upon cobalt for permanent magnets. The more cobalt in the alloy, the more expensive the magnet and the better, because more magnetic force can be stored and for longer time in cobalt alloys than in any other known permanent magnets. The best known is Alnico-5, made of aluminium, nickel and cobalt. Scientists have made a permanent magnet from an alloy of platinum and cobalt, with a claimed lifting power 24 times that of Alnico-5.

The medical uses of cobalt can prove to be the most important. Ordinary cobalt, in traces is very important for the health of both plant and animal life. In animals, cobalt together with iron and copper, helps prevent anaemia. Cobalt ought to be present 12 to 15 parts per million in soil; from 2 parts per million in plants. Where the soil is deficient, cobalt salts should be added to commercial fertilisers and animal feeds to remedy the deficiency. Vitamin B12 is known to contain cobalt in traces.

When this element is put into a nuclear reactor it becomes its radioactive isotope, Cobalt-60. New uses for Cobalt-60 are being found every year. Co-60 gives off gamma rays -- high powdered X-rays. An almost infinitesimal amount of cobalt, whose initial cost is negligible. gives the equivalent of the X-ray energy packed by a million-volt-plus machine.

Because Co-60 has a half life of 5.3 years, it can serve a useful purpose as a tracer atom in basic chemical studies. And that half life is long enough to make it useful also in industry, where it beams a stream of X-rays, through heavy metal castings, and discloses hidden flaws by non-destructive testing. C0-60 eventually may be an almost complete substitute for radium in the treatment of cancer. Bhaba Atomic Research Centre produces Co-60 for medical use in India. It has one advantage over radium. Co-60 produces only a tenth as much of the dangerous and unwanted beta radiation. Further, the output of gamma radiation from Co-60 is far more consistent and steady than from radium. Radium is very costly but Co-60 is comparatively cheap.

Co-60 is far more convenient to use. Instead of requiring expensive gold or platinum needles, Co-60 can be used with stainless steel, aluminium, even nylon containers. What is more, Co-60 needles can be placed in body locations inaccessible to radium, and the needles can be twisted and bent to fit specific local areas to provide the maximum radiation on a given site.

If the radium needle breaks, radium can lodge permanently in bone and body tissues, causing irretrievable damage. Co-60 does not lodge itself in body tissues, hence presents less of a hazard. Co-60 has been very successful in the treatment of cancer of the cervix, a very common form of cancer in women.

Worldwide cobalt production is of the order of 25,500 tonnes per year. The prices of cobalt have been fluctuating in the last few years. From US$ 110/kg in 1978, prices plunged to less than US$ 11/kg in December 1983, but rose in 1984 to US$ 26/kg. The price fall is mainly due to products developed to substitute cobalt.

In India, Sandvik Asia Ltd. (SAL) have put up a plant to recover cobalt from scrap. The plant is a part of the chemical recovery complex for the recovery of metals such as tungsten, tantalum, niobium etc. which are expensive and are currently imported. India uses about 70 tonnes of cobalt in a variety of industries dealing with cutting tools, electrochemical compounds, special alloys, aerospace industries, ceramics, permanent magnets and petrochemical reactions where it is used as an important catalyst. It is also used in medicine and pottery but the quantity used is very small.

A pilot plant can recover the metal by recycling various types of cobalt containing scrap. The plant is a multi-input and multi-output one using scrap from hard metals, converter slag, copper extraction and satellite industries. The output would include, besides very fine cobalt powder, cement grade cobalt, alloy steels, and salts such as cobalt oxalates, oxides and cathodes.

The capacity of the plant is four tonnes for 1987, six tonnes for the next and 10 tonnes thereafter in the form of fine cobalt powder. The plant and the equipment has been constructed at a cost of Rs. 26 lakhs.

India is poised to become the first developing country to break the big power monopoly in ocean mining Six years after it scooped a few bagsful of manganese nodules from the sea floor, India has announced its intention of prospecting for nodules in a 150,000 square kilometre area at the bottom of the Central India ocean India has asked the United Nations for formal allotmen of the mine site, which it identified after surveying more than three million square kilometres of the ocean floo in a record two years. India's is considered as a "pioneer investor" by the preparatory commission of the International Seabed Authority created under the UN Law of the Sea Conference.

India has no doubt beaten the deadline for applyin for the allottment of a mine site. But it is yet to be see whether it can raise the enormous capital required fo the venture, and develop the technology for mining transportation and processing of the nodules as a commercially viable operation. Besides, the environmenta impact of large scale mining in the ocean is still ver much an unknown entity. One cannot at present be sur of the environmental effects of mining nodues. For ever tonne of nodule lifted from the ocean floor, about six t seven tonnes of water from the ocean floor would b brought to surface, which could affect marine organism and the process of metals settling down on the ocea floor, the factors which influence nodule growth.

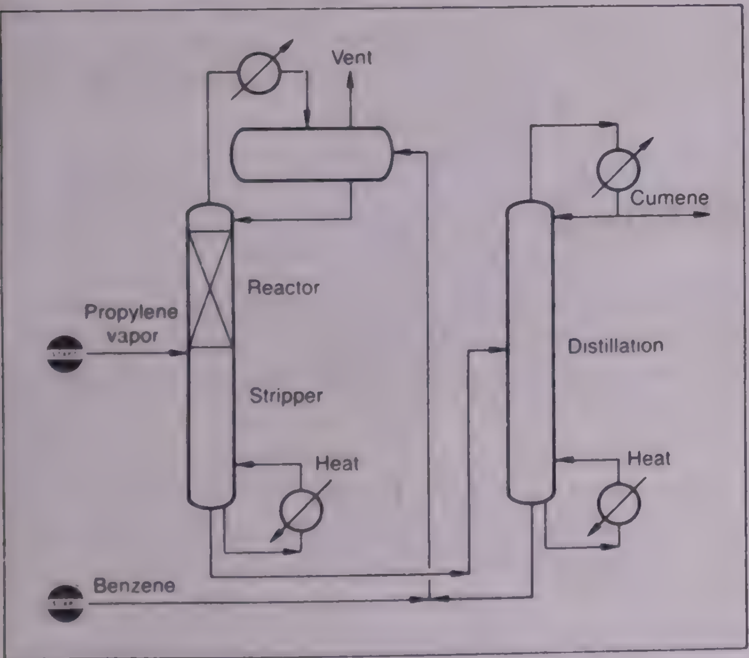
-- T.P.S. RAJA

CHEMARENA

S.L. VENKITESWARAN

Reaction-Distillation for Cumene

Combining reaction and distillation in a single column is coming to the forefront nowadays. Although this has been the practice for ethyl and other acetate esters the success with another etherification reaction -- for MTBE from isobutylene and methanol -- and the very large capacity plants for it has given rise to other such gas/-liquid reactions in distillation columns. The latest is for cumene from benzene and propylene by alkylation with high purity product and energy savings, developed by Brown & Root Inc. and Chemical Research & licensing Co., Houston, U.S.A. (*H.P.* June,1987). An essential requirement of such reactor/distillation designs is that the reaction should be fast at the boiling temperature of the liquid/feed/product at atmospheric or moderately higher pressures. An outline of the CRL process for cumene is shown in Figure.



Heat generated in the reactor helps reduce the overall heat required by the system

They have a proprietory catalyst for the reaction and this is kept inside a prefabricated support of fibreglass and stainless steel in the upper part of a column where the propylene is introduced counter current to a descending stream of benzene. The reaction heat enables benzene to be vapourised and go to the condenser to get condensed and return as reflux along with the fresh benzene feed and any heavy recycles. Propylene is fully reacted so that there is no recycle of it and only a vent of residuals emerges from the condenser. The column pressure is adjusted to give the desired operating temperature and the pressure is between 40 and 150 psig. The reaction heat vapourises three pounds of benzene for every pound of cumene and so the fluid flows down to the stripping section of the column where residual benzene is removed and the impure cumene goes to the purifying column from where pure cumene is distilled over as product while heavier fractions containing di-isopropyl benzene and higher alkylates are removed from the bottom and fed back to the reactor column where they get trans-alkylated to cumene.

The arrangement for packing of the catalyst is a bundle inside a cage like holder enables the use of mild steel for the column itself. Water needs to be excluded from the feeds and also sulfur compounds and strong alkalis to ensure a long life of the catalyst and upto two years have been clocked in trials. Propylene of any composition can be used although higher proportion of associate materials leads to larger gas flows and higher volume of vents. Ethylene or butylenes in the feed result in ethyl benzene and butyl benzene and perhaps the extension of the process system to ethyl benzene may be in the offing. Propylene conversion is claimed to be over 98% due to the recycle of higher alkylates for trans-alkylation reaction. Benzene conversion is equally high. The net heat level required is said to be 800 to 850 Btu/lb of cumene, with a saving of nearly 50%. The reboiler temperature is about 130°C with heat supplied by hot oil. A commercial size plant can be readily designed and the process can also be retrofitted to existing plants.

Antartic Ozone to be studied

One of the major hazards to the environment is the depletion of ozone levels in the upper atmosphere and this has attracted headlines due to huge levels of ozone

"Ozone Hole". The scientists of NASA at Langley led by Dr. M.R. McCormack have studied ozone levels at high altitudes for over a decade and have extended their studies to the polar regions with a view to elucidate the reasons for the sharp fall and their relation to the emissions of gases into the atmosphere -- CFC's, SO_2, nitric oxides etc. The reactions that could deplete ozone are many and chlorine (or bromine) from CFC's are probably the basic causes through formation of chlorine monoxide but the mechanism needs to be fully elucidated.

This year an International group of over 160 scientists and engineers are engaged in the Airborne Antartic Ozone Experiment. The base is the southern most tip of Chile with specially fitted air-craft for flying over and getting samples and analyses over a wise area above the South Pole. This is claimed to be the single most important Earth Science Project of the decade and the crucial question is whether the "hole" results from ozone destruction catalysed by chlorine from CFC's and if so what this means for the ozone layer covering the rest of the earth.

Last year an expedition -- National Ozone Expedition (NOZE) -- was conducted and it collected a rich load of data from ground level stations and many questions arose which need to be resolved by analysis of the air above at various levels -- and hence the present expedition which is already under way as September/October are the critical months. The phenomenon of the "Ozone Hole" in Antartica was totally unexpected and absolutely unpredicted and added a totally new dimension to the earlier investigations and theories on the causes for ozone level depletion. A version of the old U-2 spy plane with a surfeit of instruments for flight at altitudes of upto 20 kms. is the main data gatherer by flying over the ozone holes.

Among the theories on ozone depletion in the Antartic, the solar activity theory is said to be not valid. This theory postulated the ozone drop to abnormally high levels of active nitrogen collectively termed (NO_x). Odd nitrogen atoms are said to derive from blasts of high energy particles from the sun but last years' data showed that NO_x levels were lowest inside the ozone hole. This brings back into prominence the chlorine-based theories or a "dynamical" theory which suggests that forces in the atmosphere move the ozone around. Ozone is formed most abundantly at high altitudes in the tropics but the "hole" phenomenon in the Antartic is not readily explained. It is likely that certain chemical heterogenous reactions take place on the surface of particles formed at extremely low temperatures. NOZE studies revealed high concentrations of chlorine monoxide and also noticed chlorine dioxide. The chlorine monoxide levels though in ppb were two orders of magnitude higher than elsewhere.

There is every likelihood of an international agreement on the limits of CFC usage and emissions of by all countries in the near future.

Column Packings

It is reported that the new packings for distillation columns have brought out a near-revolution in Column designs and performance (*Chem. Business* of May 1987). Throughput increases of upto 50% besides reduction in energy bills have been possible in selected cases through revamping of existing distillation towers using the newer packings supplied by Glitsch or Koch Engineering or Norton Chemical Process Products Co. The old style trays of bubble cops may soon go into oblivion for large capacity separations. "Structured" packings are different from the earlier era of Rasching rings on even the random packings and give a reduction in pressure drop in addition to efficiency rise -- even to a tenth of earlier levels. The reboil ratio is reduced and energy savings effected.

Fractionation Research Institute of Pasadena, Calif is an industry-sponsored organisation to examine the dynamics of such packings and gather data for commercial designs. The Institute has over 100 members and works on 4 ft. and 8 ft. test columns. Doubling of capacity of some existing separation towers is said to be feasible and the cost may be paid off in a year. The most attactive area is said to be in ethyl benzene/sty rene separations. For an 800 mill. lb/year unit a towe of 100 trays of 2 ft. spacing are used and the structure type packings can raise capacity and also enable lowe base temperature with need for less inhibitor. The pric of the packings is 3 to 4 times that of older conventiona trays and revamping a 40 ft. dia. splitter for EB/styren costs about $ 7 millions. But newer units of smaller siz can be used for new plants with advantage. Sulze Brothers of Switzerland is a leader in the field and claim to have installed 6000 towers with such packings Structed packings provide finely dispersed liquid drop in a continuous vapour phase and not the bubbles vapour in a continuous liquid phase of the convention columns. The design of critically sized and angled slo impart a horizontal vapor trajectory at high velocity whic shatters the liquids into a fine spray. Deflectors confir the spray close to the deck and close spacing is po sible with low pressure drop and high efficiency

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Petrochemical units : Licensing suspended

The Union government has decided to suspend further licensing in the petro-chemicals industry. According to official sources in New Delhi, this follows the intervention of the finance ministry which is quite concerned over the desirability of taking up such high "domestic resources cost" projects.

The intention apparently is to conserve resources for taking up other high-priority infrastructure projects in power plant and communication sectors and in irrigation schemes.

The sources said that as petrochemical projects are extremely costly — ranging between Rs. 800 crores and Rs. 2,000 crores for a plant of economic size — it was only appropriate that licensing in this sector be suspended for the time being to facilitate diversion of resources to the crucial sectors of the economy.

In a recent communication, the finance ministry had asked the secretariat of industrial approvals (SIA) in the industry ministry to take a careful look at the desirability of further licensing of petro-chemical projects from the angle of domestic resource costs.

The sources said that the government is at present saddled with a large number of applications from both the public and private sector corporations for entry into the petro-chemical sector.

This was a sequel to the earlier liberalised policy approach of the government in regard to the petro-chemical industry which was identified as a major growth area following rapidly increasing domestic crude oil and gas production coupled with the laying of the Hazira-Bijaipur-Jagdishpur gas pipeline for optimum utilisation of this natural resource.

In fact it was in keeping with this that the Centre had also granted licences to some of the state government industrial development corporations as well to establish joint sector petro-chemical projects in equity participation with the private sector. A large number of them have yet to materialise.

The sources said that while the licensing angle will be taken care of by the industry ministry, it is expected that the government may ask the financial institutions to stop forthwith further assistance to this sector.

They point out, however, that in the event of the institutions backing out from assisting such projects, a serious situation could emerge whereby on-going schemes would result in phenomenal losses to the corporations which do not have adequate internal resource generation to carry on with these projects.

This decision would also deal a blow to the textile policy which only last year permitted the man-made fibre industry to go in for backward integration to improve their economic viability by taking up the manufacture of petro-chemical-based raw materials as well.

INDUSTRIAL ALCOHOL CREDIT SCHEME FOR CHEMICAL UNITS

The Government has announced a special scheme for allowing credit for use of industrial alcohol by manufacturers of alcohol-based chemicals.

Under the scheme, chemical manufacturers can take credit of Rs. 258 for consumption of one kilo-litre of alcohol in the manufacture of 26 specified chemicals. The credit can be utilised for clearance of specified chemicals.

The scheme is effective from October 1, 1987, the date from which the Central excise duty on molasses has been doubled from Rs. 30 per tonne to Rs. 60.

Four main conditions have been laid down by the Government for availing of the credit under the scheme First, credit shall be allowed only in respect of indigenous ethyl alcohol.

Secondly, it shall be allowed only in respect of ethyl alcohol for which the manufacturer has paid the price notified by the Industry Ministry in its order issued on September 29, 1987. In case ethyl alcohol is produced from molasses inside the factory where the specified final product is manufactured, credit may be allowed in respect of ethyl alcohol produced from molasses for which the manufacturer has paid the price notified by the Industry Ministry.

Thirdly, credit taken during any calendar month shall be utilised for payment of duty on the specified final products only after the commencement of the succeeding month.

Fourthly, credit taken may be utilised for payment of duty on any of the specified final products and the amount of any excess credit available in the credit account shall not be refunded to the manufacturer or utilised for payment of duty on any other excisable goods.

The 26 chemicals specified for the purposes of the scheme are: Acetaldehyde, acetic acid, acetic anhydride, acetone, butanol, low density polyethylene, styrene, polystyrene, vinyl chloride, polyvinyl chloride, vinyl acetate, poly vinyl acetate, poly vinyl alcohol, mono-ethylene glycol, di-ethylene glycol, tri-ethylene glycol, butadiene, ethyl chloride, ethyl acetate, diethyl phthalate, diethyl oxalate, diethyl ether, trichloro acetaldehyde, ethylene oxide, chloro acetic acid and styrene butadiene rubber (SBR).

BANGALORE SCIENTIST BAGS INSA AWARD

The Indian National Science Academy (Insa) on 5th Oct. presented 1987 Insa medal to 16 young scientists for their contributions in various fields of science, engineering and technology.

The recipients included Dr. Ajay Kumar of the Central Drug Research Institute, Lucknow, Dr. D. J. Biswas, a physicist from the Bhabha Atomic Research Centre (BARC), Dr. S. K. Biswas of the department of electrical engineering, Jadavpur University, Calcutta, Dr. Dipankar Dutta of Manipur University, and Dr. Gotam Jarori of the solid state physics group at Bombay's Tata Institute of Fundamental Research (TIFR).

Other recipients were Dr. C. Joenathan of the engineering design centre at the Indian Institute of Technology, Madras, Mr. Mahammad Islam Khan of the molecular biophysics unit at the Indian Institute of Science, Bangalore, and Mr. P. Ananda Kumar of the Indian Agricultural Research Institute at New Delhi.

Dr. Sujata Lakhani from Delhi university's botany department, Dr. Priti Mehrotra of the department of zoology, Banaras Hindu University, Dr. R. D. K. Misra, a scientist from the Defence Metallurgical Research Laboratory, and Dr. Sourav Pal from the National Chemical Laboratory, Pune, also recei-

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Import and excise changes : auxiliary duty up 5 per cent

The auxiliary duties were raised by 5 per cent on 19 September (effective 19-20 September midnight). However, the hike will not be applicable on notifications and items to which Nil auxiliary duty is applicable. The application of LA (List Attestation) Procedure on spares for after sales service has been partially liberalised. Custom duty on important chemical raw materials was cut. The excise duty on supplies to the HBJ pipelines were streamlined.

AUXILIARY DUTY

Auxiliary duties were raised by 5 per cent through amending notification No. 320 issued on 19 September. Essential imports were, however, exempted from the hike. Table I gives the details of the changes.

On examining the amendment, we find that little thought on fine tuning an impact has been given. For example, the duty structure on quite a few machinery groups such as garment machinery, printing industry machinery and so on, is only 35 per cent. The duty on these will remain unchanged However, machineries on which relatively higher rates of duties (above 50 per cent) is attracted will be adversely affected after the 5 per cent hike. Project imports will now attract 90 per cent duty in the general case as against 85 per cent in the previous dispensation. In specific cases, such as power projects and fertiliser projects, the old duty rates will continue. The duties on parts and components will also go up by 5 per cent. On the other hand, computers and electronic components will remain un affected even in cases where basic duty is more than 50 per cent.

Crude petroleum and POL imports will remain unaffected by the hike The auxiliary duty on crude continue as before. In the case of POL, N auxiliary duty dispensation is alread available. However, special POL product, which may not be covered b the Nil auxiliary duty notification wi attract 5 per cent additional duty.

The incidence on total duty will b more than 5 per cent since the add tional duty, also known as counterva ing duty, is applicable on auxilia duty. In the typical case, the hike

(Contd. on p. 4

TABLE I

AUXILIARY DUTY CHANGES

Auxiliary duty Notification No. and date	Subject	Amendment, if any by 320/19-9-87
205/12-5-87	(1) Crude Petroleum of Heading 27.09	No change.
	(2) All other goods in Customs Tariff Schedule	Duty raised from 40 per cent to per cent.
206/12-5-87	47 specified goods covering essential items and others covered under GATT agreements.	No change in Nil duty.
207/12-5-87	297 notifications specified for Nil auxiliary duty.	No change
208/12-5-87	15 grouping covering important machinery and raw material.	Auxiliary duty raised from 25 per to 30 per cent.
209/12-5-87	80 specified notifications.	Auxiliary duty raised from 25 per to 30 per cent.
213/12-5-87	Parts for initial set up or assembly or manufacture of 32 specified machinery groups.	No change in basis (Duty) same that on complete machine.

(Extracted from BIG's Weekly Index of Changes, 28 September 1987)

TABLE II

DUTIES ON PLASTIC CHEMICALS

Heading/Sub-heading No.	Items	Previous duty (Basic+Aux.)	Current duty (Basic+Aux.)
3903.00	(i) Polystyrene	100% plus Rs. 5000/MT+40%	30% + 30%
3904.10	(ii) Polyvinyl chloride —		
	(a) Paste grade resin or battery grade resin	Rs. 15000/MT+Nil	Rs. 4000/MT+
	(b) Others	Rs. 7500/MT+Nil	Rs. 2000/MT+
3901.10	(iii) Polyethylene having a specific gravity of less than 0.94	75% + 40%	Rs. 3000/MT+

Courtesy : BIG Data base in Economic Times

CIPET told to expand activities

The Union Minister for Chemicals and Petrochemicals, Mr. R. K. Jaichandra Singh, has asked the Central Institute of Plastics Engineering and Technology (CIPET) to strengthen its activities to meet the industry's demand for supervisory and managerial personnel.

Besides the Institute, the Indian Society of Polymer Science and other specialised institutes must play a vital role by organising workshops and seminars for better interaction among the scientists and technologists, he stressed.

Inaugurating a workshop on plastic processing and applications organised by CIPET and the Society, the Minister pointed out that the Government had assigned an important role to the institute and taken steps to expand its activities keeping in view the ambitious plans to increase raw material production.

In addition to the centres in Madras, Ahmedabad and Hyderabad, CIPET would have four more at Lucknow, Bhubaneshwar, Bhopal and Imphal with each specialising in different areas, Mr. Singh noted.

Referring to the poor per capita consumption and the concentration of the plastic processing units in the small sector using mainly indigenous technology, the Minister said this called for upgrading the current machinery and introducing new technologies.

The machinery manufacturers should also identify the inadequacies in the processing industry and upgrade the quality of their equipment. This would help the units to meet the demand for high quality products from automobiles, electronics and telecommunication.

In his keynote address, Mr. K. N. Venkatasubramanian, Executive Director of IPCL, Baroda referred to the constraints facing the plastic processing industry like shortage of materials and trained manpower, lack of prototype centres for quality improvement and inadequate mould making testing facilities.

He stressed the need for developing more prototype centres, setting up of fully modernised and well equipped mould making centres at important locations, testing laboratories at important consumption centres, introducing plastic technology courses at IITs, polytechnics and adjusting fiscal levies to facilitate liberal import of material.

Dr. I. S. Bharadwaj, Director of CIPET welcomed and Prof. H. Kothandaraman, Secretary of the Society for Polymer Science, proposed a vote of thanks.

(Contd. from p. 40)

total duty, where the additional duty is 15 per cent, will be 5.75 per cent. Quite a substantial portion of the import may manage to avoid the increase in duty by the general practice of under invoicing import.

Plastic chemicals

The import duties on PVC, polystyrene, LDPE and HDPE were scaled down by notification No. 311 and 312 of 15 September. The basic duties were reduced substantially. On the other hand, the auxiliary duties were raised. On balance, the duties structure is significantly below the previous rates. The current duties after accounting for the auxiliary duty hike above, are given in Table-II.

The basic duty on HDPE moulding powder and granules was revised down from 60 per cent to 30 per cent. With auxiliary duty of 45 per cent, the total for basic and auxiliary is 75 per cent.

The intention behind the move is not clear. Possibly, the government wishes to reduce the price of these items in the domestic market. On the other hand, the reduction in duty will lead to falling in revenue realisation and also affect the fortunes of the Indian manufacturers. Most of these plastic chemicals are on OGL for Actual Users (Industrial). Industry claims that users are mostly in the small scale sector and import should therefore be on OGL for all persons rather than for Actual User (Industrial) only.

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Dr. O. P. KHARBANDA

Frankly Speaking

O. P. KHARBANDA
Cost & Management Consultant,
501, Olympus, Altamount Road, Bombay-400 026.
(An author of repute and a visiting professor, Dr. Kharbanda consults worldwide including to UNIDO).

One Company's Liability - Another's Asset

Petrochemical industry worldwide has been saddled with over-capacity, low margins and even losses. No wonder that in an effort to 'rationalise' some companies, even the 'majors' such as Du-Pont ICI and PPG. are keen to sell off some of their petrochemical 'liabilities'. And surprisingly, there are ready buyers too who see these as great 'assets' specially at the prices they need to pay for them. Such 'buy outs' have become quite common and even attractive to the buyer, since the cash required may be a mere 10% of the 'bargain' price the rest 90% being provided by knowledgeable vendors who see it as an attractive investment proposition. But the buyer must have a good 'feel' of the industry and be able to see its future prospects. There is, of course, an element of gamble, but then one always has to take a calculated risk in any business. The buyouts of this type are appropriately termed leveraged buy outs (LBO, for short) and they offer a tremendous opportunity.

A 75 year old industry veteran who has made this business his full time business is Gordon Gain formerly president of Alaska Petrochemical, president of Petrotex Chemical and vice-president of Conocco Chemicals — just the right credentials for the LBOs. By early 1987, Cain had 'logged' as many as 15 LBO's the latest one (the fourth in the chemical industry) being by far the biggest. Cain managed to raise some $1.1 billion for buying 7 recently built plants in Texas including ethylene and high density polyethylene (Du Pont & Corpus Christi Petrochemical) and ethylene oxide/glycol (ICI & PPG). These facilities will be managed by the newly formed, Cain Chemical Inc. which is owned by Gordon Cain's Sterling Group, a private financial company which also advises corporate clients on mergers and acquisitions. Some two years earlier, Cain had formed Vista Chemical when Conoco's chemical business was purchased from Du Pont who saw commodity chemicals and plastics as a low growth area in to the high-value added specialities.

LBO is seen like purchasing a home with a mere 10% or even less down-payment the rest being provided by lenders who see it as a good investment. The price is usually a fraction of the original cost or replacement cost, the tangible assets value is significant, but the timing of the LBO should be such that a turnaround in the industry seems imminent. By virtue of their experience and a 'feel' of the 'pulse' of the industry, the new owners can operate the assets very economically, make marked reduction in operating costs and thus ensure that the interest obligations can be met from self-generated cash. The vital figure to watch is the EBDIT, i.e., the earnings before depreciation, interest and taxes instead of the normal key statistic of net profit after tax. By virtue of their stake, the management and employees are highly motivated and they are willing to put in their best — for their own sake. The managers do not have to spend unnecessary time satisfying the corporate bureaucracy and they have a positive incentive to opt for profits rather than the conventional market share.

But there are problems too and the acquirers must not ignore them. Because of their personal stakes and the large sums of money involved, LBO's are not for the 'fainthearted'. The managers are under a great deal of pressure specially in case of a downturn in the market, there being no 'cushion' to fall back on. Also it is a risky business and there is no cash for investing in long-term research and development work. Commodity chemicals and plastics have seen wide fluctuations in profitability and this can jeopordise the servicing of huge debt. Cultural compatability is important for success.

Either way, whether an LBO succeeds or not, it always forms an interesting case study for business schools. The motivation for the seller is usually restructuring for better and continued profitability. The buyer sees in an LBO a good 'bargain' which he can transform into a valuable and good yielding asset by virtue of his deep knowledge of the industry and concious cost cutting in every department. The overheads are also kept low. And with the cyclical nature of business in general, the asset can prove even more valuable when an upturn in the market occurs.

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Subsidy likely for units making vital drugs

The Centre is seriously considering a proposal to give subsidy to the manufacture of essential and life-saving drugs in categories-I and II to keep their prices at reasonable levels.

This was disclosed by Mr. R. K. Jaichandra Singh, Union Minister of State for Chemicals and Petrochemicals, at a news conference in Madras on October 8.

He said the new Drug Prices Control Order (DPCO) with only two categories covering 166 bulk drugs and formulations would ensure better control on the prices of essential drugs. In the case of de-categorised drugs, an effective monitoring mechanism involving random checks and analysis of feedback from consumer lobbies would see to it that there was no undue escalation in prices unless dictated by input costs.

The Minister noted that there were instances in the past when some of the drugs, the prices of which came under the controlled category, were sold at lower prices in the market. Therefore, he was confident that the prices of the new de-categorised drugs would be regulated by 'market forces'.

One of the most important features of the new drug policy was the decision to set up a National Drugs and Pharmaceuticals Authority (NDPA), Mr. Singh said. The authority would, among other things, initiate measures for quality control by establishing regional drug testing laboratories which were presently available only in a few States, he added.

He pointed out that the laboratories would be of immense use to the 8000-odd small-scale drugs and pharmaceutical units in the country. Privately-owned laboratories would also be recognised.

The new authority would be constituted in December this year.

Turning to the projects in Tamil Nadu, the Minister informed that a final decision on the co-promoter for the PTA plant being set up by MRL was yet to be taken though the Indian Petro-Chemicals Ltd. (IPCL) had evinced keen interest in the proposal. The detailed project report was also under preparation.

The 60,000-tonne capacity Linear Alkyl Benzene (LAB) project, based on kerosene feedstock, was slated to be commissioned by the end of this year. The Minister, however, hinted that in case the Reliance LAB project based on imported normal paraffin (N-paraffin) was given the go-ahead, the Madras project would be offered certain concessions.

Another project being implemented in Tamil Nadu was the polyester fibre and yarn plants by the Indian Organic Chemicals Ltd.

Giving a bird's eyeview of the unfolding petro-chemicals scenario in the country, Mr. Singh indicated that a couple of the proposed gas-based fertiliser projects on H-B-J pipeline would have to be dropped in case a gas cracker plant of 3.2 lakh tonnes capacity at Hazira, now on the anvil, was cleared.

As for the Haldia petrochemical complex, the Ministry had agreed to a suggestion for a change in the product-mix and the project was expected to be commissioned by 1992. In Vizag, the Engineers India Ltd. was in the process of preparing the detailed project report on the proposed Rs. 1800-crore naphtha cracker plant which was expected to be submitted by the end of this month.

CONSORTIUM TO TAP PLASTICS POTENTIAL IN MAHARASHTRA

Five State-owned corporations have proposed to form a consortium to explore the investment possibilities in the plastic ancillary industry in Maharashtra.

The aim is to tap the investment potential to be created in downstream and ancillary units, by the Maharashtra Gas Cracker Complex (MGCC), coming up at Nagothane in Raigad district.

The members of the consortium are Maharashtra Industrial Development Corporation (MIDC), Maharashtra State Financial Corporation, Maharashtra Small-Scale Industries Development Corporation, State Industrial Investment Corporation of Maharashtra and the Development Corporation of Konkan Ltd.

The proposal is that the consortium will invest about Rs. 150 crores in projects producing plastic and plastic products. Apart from undertaking own projects, the consortium will also go in for joint venture with equity participation and extend financial assistance to private parties. It will first undertake a detailed study on the scope of setting up small units which can utilise the output of the MGCC.

The Rs. 1200-crore Maharashtra Gas Cracker Complex is scheduled for commissioning in 1989. According to a preliminary estimate the complex will generate ancillary industry worth over Rs. 10,000 crores.

STUDY ON REFINERY CAPACITY IN KERALA

A study is being conducted to ascertain if there is a need for a separate refinery in Kerala or if expanding the capacity of the existing Cochin Refineries is sufficient, according to the chairman and managing director of the refineries, Mr. J. Jayaraman.

The company's future plan identifies proposals for diversification into petrochemicals, a Rs. 200-crore linear alkyl benzene project and yearly production of 12,000 metric tonnes of toluene. A letter of intent for toluene manufacture has been approved by the Centre.

Mr. Jayaraman said the Cochin Refineries registered an an all-time high production record of 4.166 million tonnes in 1986-87 against the present capacity of 4.5 million tonnes. The net profit was Rs. 4.65 crores. He added that 'thruput' and capacity utilisation during 1985-86 were only 2.75 million tonnes and 61 per cent respectively earning only Rs. 25 lakhs as profit.

The current production of liquifie petroleum gas at the refineries i 10,000 to 12,000 tonnes per month a against the earlier annual productio of 18,000 tonnes. This has been possible after an expansion plan and th refinery fills about 6,000 cylinders o an average every every day.

Mr. Jayaraman added that the Rs 75.8-crore project for the productio of 87,200 tonnes of benzene ever year would go on stream by Februar 1989. The gas would feed the caprolactam unit of the Fertilizers an Chemicals Travancore Limited (FACT and phenol plant of the Hindustan O ganic Chemicals Limited which is nea ing completion.

CHROME ORE BENEFICIATION PLANT :

OMC to float global tenders

The Orissa Mining Corporation Ltd. (OMC) is set to float global tenders soon for the selection of know-how for its Rs. 13.5 crore chrome ore beneficiation plant. OMC is also planning for substantial expansion of its iron ore mines in Daitari.

The process parameters for the chrome ore beneficiation plant to be located at the south Kaliapani mines of the corporation in the Sukinda Valley in Cuttack district, have already been identified by the minerals dressing laboratory of the Bhabha Atomic Research Centre in Hyderabad. It will beneficiate 1.65 lakh tonnes of low-grade ore (of 30 to 35 per cent) per year to produce 85,000 tonnes of concentrate of saleable grade. With the commissioning of the plant, expected 24 months after work started, chrome ore production of OMC would go up to four lakh tonnes per year from the present 2.5 lakh tonnes, according to Mr. N. C. Das, chief executive of the corporation.

OMC has already found use for low grade fines of 40-45 per cent content by feeding the 100 per cent export-oriented charge chrome plant of its subsidiary, OMC Alloys Ltd., at Baminipal in Keonjhar district. which was commissioned in November last year.

OMC also proposed to expand its Daitari iron mines in Cuttack district to produce about 18 lakh tonnes per year from the present five lakh tonnes, Mr. Das said. The plan has been conceived in context of the proposed modernisation of the Rourkela Steel Plant (RSP) and stepped-up export of ore to South Korea as envisaged by the Paradip port development project. OMC is shortlisting consultants to do the feasibility report of the Daitari expansion. Meanwhile, the mining and geology department of the state government has commissioned Development Consultants (P) Ltd., Calcutta, to cross-check on the availability and requirement of ore, infrastructure, environmental safeguards etc., for stepping up ore exports through Paradip port to six million tonnes a year from about two million tonnes at present. The Daitari expansion will be finalised in tune with the overall projections, according to Mr. Das

OMC, at present, supplies two lakh tonnes of lumpy ore to RSP from its Khandahar mines near the MP border. After the Daitari expansion which will require substantial investment in both mining equipment and plant, it will supply ore fines to RSP to the tune of five lakh tonnes. RSP phase-I modernisation involving revamp of the raw material processing sections of the steel plant, will lead to working of the plant at 100 per cent of its present installed capacity of 1.8 million tonnes.

Mr. Das disclosed that OMC would soon float tenders for the execution of its 6,000 tonnes capacity China clay washery project to be located at Dumaria village in Mayurbhanj district. OMC's China clay leases in the area are estimated to hold 10 million tonnes of reserves.

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Scientists urged to put resources to best use

Scientists were asked to put the available natural resources to the best use to meet the country's needs by Prof. M. G. K. Menon, special adviser to the Prime Minister.

The gap between material and manpower resources had to be bridged for an optimal use of the developments in various fields.

Prof. Menon, who is the President of the National Academy of sciences, was inaugurating a two-day national symposium on "New materials —role, development, production and use in key sectors of national relevance," sponsored by the Academy and held under the auspices of the Bharathidasan University.

"We have in this country enormous capabilities developed in the contemporary areas of materials sciences and technological transfers of these materials and hence we are well placed and poised in this field as any other advanced nation," he said.

Cataloguing the advances in all sectors — from informatics, telematics and fibre optics to space, polymers and nuclear science — Prof. Menon highlighted the latest researches by the "very best brains in the country".

New developments :

Pointing out that nearly 60 per cent of the plan outlay went into the construction and one third of this for materials, he said that even in such a mundane area efforts were on to find out newer and better methods of using materials. The construction technology itself had undergone tremendous changes.

On the strides made in the field of bio-materials, Prof. Menon explained how instrumentation had helped the medical field, especially in surgery.

Wasteland reclamation :

Prof. U. S. Srivastava, General Secretary of the Academy, traced the growth of the Academy and its contributions and said that it had come out with recommendations on reclaiming wasteland. These recommendations were with the Centre and the Wasteland Development Board.

Over 250 Academy members are attending the symposium.

There were five technical sessions. The first on polymers was chaired by Dr. S. Varadarajan, chief consultant, Planning Commission in which Mr. Sriram, general manager, IPCL, Dr. R. A. Mashelkar, Deputy Director, NCL Pune, Prof. Ramaseshan, professor emeritus, RRI, Bangalore and Mr. J. Abdul Kalam, director, DRDL Hyderabad, spoke.

Prof. Ramaseshan, Dr. H. C. Visvesvaraya, chairman and director-general, NCC BM, Delhi, Dr. Mohanrai, Deputy Director, CBRI, Roorkela, Prof. M. S. Valiathan, Director, SCTIMS, Prof. K. L. Chopra, Director, IIT Kharagpur, Dr. A. K. Sreedhar, Director, Solid State Physics Laboratory, Delhi, Dr. P. K. Saha, Deputy Director, CGCRI Calcutta and Prof. A. Paul, IIT, Kharagpur participated in the discussions at the technical sessions.

ICMR SCIENTISTS BREAKTHROUGH IN DRUG DESIGN

A biophysicist working at the Indian Institute of Science in Bangalore claims to have evolved a "molecular modelling approach" that he says will help cut down the cost and time involved in development of new drugs.

Dr. B. S. Sudhindra, a super-numerary grade research scientist of the Indian Council of Medical Research (ICMR) says the new methodology has "solved the central problem in drug research."

According to Dr. Sundindra, the efficacy of a drug depends on the binding of the drug molecule with receptors such as enzymes and peptides in the body.

Because the molecular structure of the receptors are still unknown, drug design today is a gamble and there is no drug of choice for nearly two-thirds of all ailments.

By using computers and three-dimensional graphic systems, Dr. Sudhindra has developed a modelling approach to identify the structural features of the receptors. As a result, new drugs can be designed faster.

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Small-scale units sore over excise relief withdrawal

Small-scale manufacturers have criticised the government for the sudden withdrawal of excise duty concessions on goods manufactured by them under the brand name of another concern, which is not eligible to it.

In a memorandum to the finance ministry, the manufacturers described the withdrawal as a sudden reversal of government policy regarding excise duty to be paid on supplies made by the small-scale sector to the brand name owners.

The memorandum pointed out that the government had categorically stated in this year's budget, that the small-scale units, which supply goods in the brand name of purchasers, would be entitled to duty concessions. However, within five months of this policy, the government had without giving prior notice withdrawn the concessions from October 1, 1987.

The withdrawal of this duty, the memorandum stated, would suddenly dry up orders for the goods which means a setback to atleast 30 per cent of the small-scale manufacturers, who solely depend on brand name owners for the sale of their goods. The withdrawal of concessions cover a wide spectrum of goods ranging from cosmetics and toilet preparations to air-conditioning, refrigeration and electric appliances.

As per the government policy the small-scale sector was to be provided with the marketing help from the organised sector. The idea was that this policy would necessitate investment of substantial sums in a very short period and a marketing net-work of their own. Several small-scale manufacturers would be left with no option but to close down.

Even if the marketing organisations decide to buy these goods by paying higher excise duty, they are bound to recover from the consumers these higher excise duties by increasing their prices. Knowing the brand preference of the consumer, it would only add to the already accelerated inflationary cycle.

Destabilising small-scale enterprises which generate maximum employment at a time when economic con-

only worsen the prospects of bright industrial growth, the memorandum adds.

The memorandum urges the government to withdraw the decision or at least defer it till the next financial year.

NO EXTENSION OF VALIDITY OF LICENCES

The Secretariat for Industrial Approvals (SIA) will not extend the validity period of licences issued under the de-licensing provision of the Industrial Development and Regulation Act if the licences fail to commence commercial production within two years of the approval.

The licencees will have to apply afresh for approval to SIA. A number of industrial undertakings have been approaching the department for industrial development to revalidate the registration certificates as it was difficult to commence production within a period of two years.

According to a press release issued by the department at New Delhi on October 6th under the delicensing provisions of the secretariat have been issuing registration certificates in respect of entrepreneurs coming up with applications for such registration under the scheme of delicensing. Such registrations are issued with a condition that the validity of the delicensed registration will be for a period of two years from the date of issue of the registration and the undertaking concerned should commence commercial production within this period. However, if the undertaking does not commence commercial production within two years from the date of issue of such registration, the certificate of registration would automatically lapse.

Parties will be required to submit fresh applications for registration to the SIA with the requisite fees and the SIA on receipt of such applications will issue fresh registrations to the parties concerned in lieu of the registration certificates which had since lapsed. Such fresh registrations will also be valid for a period of two years during which the undertakings are expected to commence commercial production.

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Group on PTA project proposal set up

The Union Government has set up a group consisting of two senior Government officials to decide which of the three proposals mooted for setting up a plant for manufacturing purified terephthalic acid (PTA) in Madras should be accepted.

The two members of the group are the Secretary in the Dept. of Petroleum and the Secretary in the Department of Chemicals and Petrochemicals. The group is expected to finalise its report by the end of this month.

The need for setting up this group arose as Madras Refineries Ltd., (MRL), the chief promoter of the PTA project, is not agreeable to limiting its options of setting up the plant only in collaboration with IPCL.

It was earlier decided, although tentatively, that MRL and IPCL would join hands to set up the PTA plant with an annual capacity of 1.5 lakh tonnes. In fact, IPCL's proposal for setting up the plant in collaboration with MRL was submitted to the Government quite a few weeks back.

But subsequently, MRL has expressed its desire that it should be given the option of choosing from various alternative proposals. Interestingly, the three alternative proposals, being considered by the group, include the one for a collaborative venture between IPCL and MRL.

The other two proposals are for implementation of the project by MRL on its own and for setting up a Joint venture with a private sector company to implement the PTA project. The MRL-IPCL joint venture proposal has some unique features. According to official sources, under this joint proposal, the PTA project would be set up with the two divisions. One division would be under MRL and another under IPCL. The MRL division would produce paraxylene from naphtha and supply paraxylene to the IPCL division, so that the latter could produce PTA from it.

The arrangement will have two major advantages. Both MRL and IPCL would be able to absorb the shocks of a new project in its initial stages from the production as well as profitability points of view. Moreover, both the companies would be able to save on taxes as their profits could be offset against the losses likely to be incurred on these divisions in the early stages.

These advantages can be obtained only if MRL sets up a division under it to produce paraxylene, raw material for PTA, and IPCL sets up a division under it to produce PTA from the paraxylene it gets from the MRL division. These advantages would not be there if IPCL and MRL set up a new company to implement the PTA project.

Moreover, such an arrangement is seen as confirming to the new policy of the Government to encourage the refineries to produce as much value-added oil products as possible. It is for this reason refineries are asked to produce N-Paraffin from kerosene, instead of directly selling kerosene to the industrial users. Sale of N-paraffin to industrial users would earn more for the refineries because of value addition.

Under the proposed arrangement, MRL would produce paraxylene from it's petroleum-based raw materials as its own division and sell it to IPCL's division after value-addition.

The second proposal under consideration is for MRL setting up the plant on its own. It is argued that the company is generating enough profits and could mobilise adequate capital from internal and external sources to put up a PTA plant on its own. The advantage in this case is that the raw material comes from MRL itself.

The third proposal is for MRL joining hands with a private sector partner to set up the project. One of the likely parties with which MRL can set up the plant is SPIC. Here also a new joint venture company has to be formed to implement the project.

The total estimated cost of the 1.5 lakh-tonne PTA plant is over Rs. 350 crores. Sources say, investment and other technology-related decisions would be taken only after the two-man panel submits its report on which of the alternatives should be chosen. It is only after that the PTA proposal would be placed before Projects Approval Board in the Industry Ministry.

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AKING OUT R & D LABS FROM CSIR :

SACC rejects suggestion

The Scientific Advisory Commit- to the Cabinet (SACC) has rejec- the recommendation that the R and laboratories should be taken out of purview of the Council for Scien- ic and Industrial Research (CSIR) d attached to their parent depart- ents. SACC, which is the highest dvisory body on matters of science d technology, attached to the Prime inister's secretariat, is of the view t the present system of the labora- ries remaining with CSIR with stren- thening of the existing infrastructure hould be continued as part of the re- rganisation of CSIR.

CSIR is 45 years old R and D body hich controls roughly 40 leading la- oratories in the country working in lmost all scientific and technological isciplines.

An expert panel under the chairman- hip of planning commission member bid Hussain had suggested, among ther things, that the R and D labora- ories should be taken out of the CSIR. These should function under their res- ective ministries and departments. The panel had also suggested that hese laboratories should earn at least 0 per cent of their financial re- uirements by selling the technologies eveloped by them.

In an integrated report, the panel ad made several other suggestions hich were of non-controversial na- ure. Transfer of labs and generation f internal resources had resulted in aximum resentment in CSIR and the cientific community as a whole.

The report with adverse comments om CSIR was sent upto SACC which as vindicated CSIR stand.

Authoritative sources point out that ACC has suggested that CSIR should ave a three-tier system, involving the entral technology commission, assist- d by technology boards and technolo- y councils. The central commission ould be the highest policy-making ody. The boards would be respon- ble for R and D in the high techno- gy and the relevant technology areas. he number of boards could range between seven and ten. The areas could be bio-technology, semi-conductor, micro electronic computers and so on.

The councils which would be at the lowest level would look into the areas of research and technology which is not frontier technology but a sort of import substitution and adaptation of imported technology and an improvement upon it.

It has been suggested that on the commission, the board and the councils representatives from the ministries and the private sector should be nominated. These members should specify their technology requirements and set tasks before the R and D labs. It is pointed out that such an integration and close co-ordination would give a direction to the labs which would know the requirements of the industry and the government departments. These labs in turn would channelise their efforts to achieve the goals thus set before them.

PESTICIDES PRICE CONTROL UNDER STUDY

The Union government is considering regulating the prices of certain commonly used pesticides being manufactured and marketed in the country.

An indication to this effect has been given in a recent communication of the Union minister for agriculture, Mr. G. S. Dhillon to the Karnataka minister of state for agriculture Mr. Basavaraj Patil Anwari.

Reacting to a specific suggestion by the Karnataka minister that the prices of pesticides should be brought under a common rate structure on the lines of fertiliser pricing, Mr. Dhillon communicated that fixation of prices for pesticides would require a very elaborate administrative structure unlike in fertilisers as there were over 100 pesticides with a number of formulations for each. "Nevertheless, regulation of the prices of a few pesticides, which are most commonly used, is under government's consideration", the communication said.

Mr. Dhillon also indicated that a new scheme to share the losses of seed corporations owing to surplus seeds remaining unsold on account of natural calamities and scanty rainfall, was under the consideration of the Union government.

The government has imported 35 tonnes of sunflower seed of improved peredovik varieties from Russia at a "heavy cost" for distribution to states. A good quantity has been allotted to Karnataka for multiplication in the 1987 kharif season and distribution to farmers during the Rabi 1987-88.

The centre had earlier imported 100 kg of sunflower hybrid NS-H-27 seeds from Yugoslavia in kharif 1986, through the National Seeds Corporation and put on trial for testing its performance under Indian conditions.

The Karnataka government's plea that the seed farm occupying over 8000 acres at Javaigera in Sindhanoor taluk of Raichur district be transferred to the newly established farm university has been turned down as the Centre had decided to retain all the seed farms including the one at Javalgera with the State Farms Corporation of India.

The Union agriculture minister has also favourably reacted to the suggestion by state government that the "revenue circle" as opposed to the entire taluk, should be taken as a unit for claims under the comprehensive crop insurance scheme. "In case, the government of Karnataka had got crop cutting data for the last five years in respect of the revenue circle, the unit size on crop insurance in Karnataka may be fixed at that level", the communication said.

The centre has also rejected state government's plea that river valley projects programme of Tungabhadra, Nagarjunasagar and Nisarsagar should be given relief under the soil conservation projects for the catchment of river valley projects operated by the Centre. "The state government had not sent any proposal while the original scheme was being formulated around 1984-85", Mr. Dhillon stated.

Besides on account of 'resource constraints, the soil conservation programme could not be extended to any of the nine new catchments for which proposals were received from other state governments.

FACT REVIVAL — I

Efficiency fails to pay off

The state-owned Fertilizers & Chemicals Travancore Ltd. (FACT) has learnt at its own expense that efficiency does not always pay. In fact, efficiency may even boomerang, as is being experienced by this Kerala-based multi-divisional corporation with an annual turnover of over Rs. 332 crores.

Running old and outdated plants, that should have ideally been scrapped many years ago, and achieving capacity utilisation levels much above expectations have in no way helped FACT's case for early replacement of the obsolete plants with new machinery. The Government's argument is why should there be a need for replacement if the present management could achieve a fairly high degree of capacity utilisation with the old plants.

The FACT management points out that all fertiliser plants are normally scrapped after 15 years. The urea and ammonia plants with which FACT is saddled were all commissioned before 1973, the earliest being set up in 1947. FACT's proposal for replacement of the urea and ammonia complex is gathering dust at the Centre since May, 1986. The Government's reaction is limited only to the argument that the current efficiency level does not call for replacement.

But the Chairman and Managing Director of FACT, Mr. N. B. Chandran, feels that the management of the company is "flogging a dead horse by making the old plants run at an average capacity utilisation of over 65 per cent and the offices are suffering from stagnation as there has been no expansion in the fertiliser complexes in the las
10 years."

Mr. Chandran told a group of v
siting newsmen last week that th
Government should take a dec
sion on its proposal for replacing th
ammonia and urea plants with a nev
ammonia-urea complex at an estimated cost of Rs. 383 crores at th
earliest, so that the public secto
unit could formulate its strategy fo
re-deployment of manpower withou
causing any industrial unrest.

The proposal for the ammonia ure
complex is for a urea plant of 1,10
tonnes per day capacity and an ammonia plant of 900 tonnes per day capacity. Mr. Chandran said he was even willing to drop the plan for setting up the urea plant if only the Government agreed to allowing the ammonia plant.

According to his plans, 400 tonnes of ammonia out of the 900 TPD plant would be given as raw material to the ammonium sulphate and caprolactam plant that is likely to go on stream from September, 1988. The remaining 500 tonnes would be utilised for making urea.

The urgency for clearance of the ammonia-urea complex can be gauged from the fact that FACT has not yet made its full recruitments for the caprolactam plant. Its plan is to shift the employees of its existing ammonia-urea plants, put at 2,000, to the caprolactam plant. This would ensure utilisation of the entire workforce, which otherwise might have to go jobless during the period of replacement.

Mr. Chandran said the entire capital for the replacement of old ammonia-urea plants with the new complex would have to be provided by the Government. It neither had reserves of its own nor could it mobilise the capital from market borrowings, as it did not enjoy a very high profile in the capital market and market borrowing was not considered a safe prospect for a fertiliser company in view of some recent setbacks faced by large fertiliser projects.

The FACT chief executive took pride in the fact that it wiped out its entire accumulated loss of over Rs. 72 crores in last four years with consecutive profits of Rs. 11 lakhs in 1983-84, Rs. 19.28 crores in 1984-85, Rs. 11.24 crores in 1985-86 and Rs.

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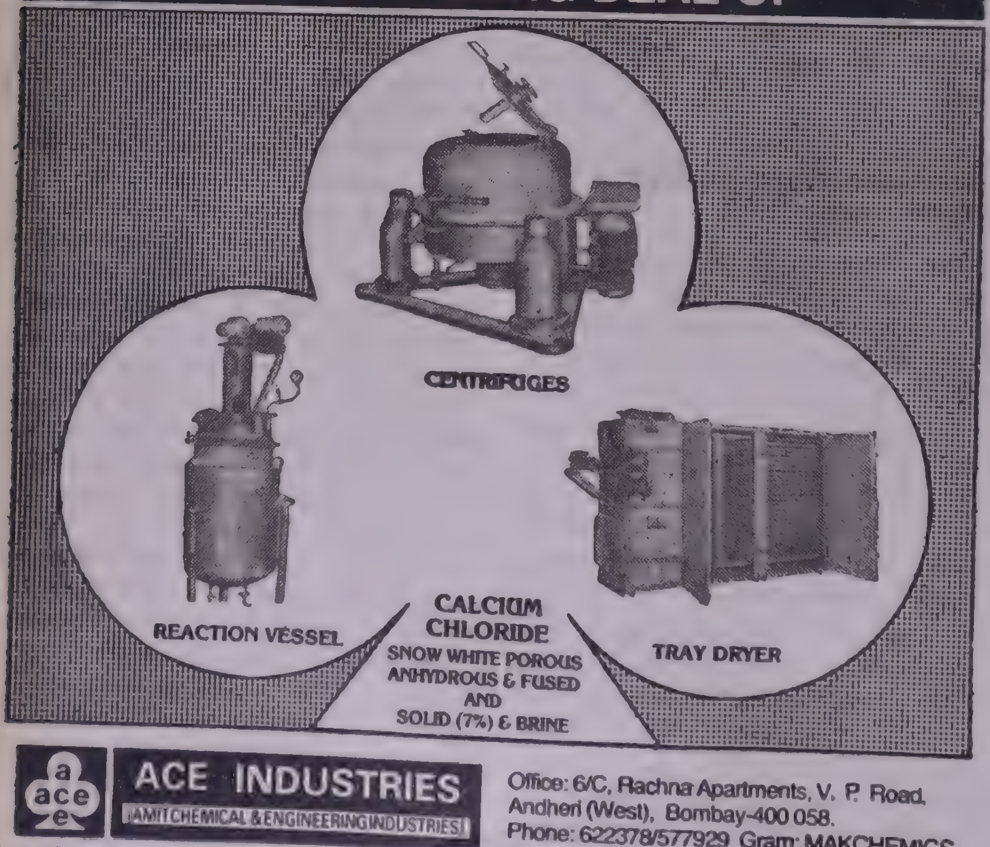

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/5 crores in 1986-87. This contri-
ed to a cumulative profit of Rs. 47
ns for FACT at the end of 1986-

le, however, expressed concern at
current drought situation and the
per cent power cut imposed on his
ts by the Kerala State Electricity
ard. The drought would depress
CT's fertiliser sales and the power
imposed despite the Centre's in-
vention, would affect the produc-
n in the current year.

Mr. Chandran's fear is that if the
wer cut is increased to 50 per cent,
fertiliser output would not be able
touch the one million tonnes target
1987-88. Instead, it would range
und 9.2 lakh tonnes.

Explaining how FACT managed to
n its huge accumulated losses into
ofits in a short span of four years,
said a new marketing strategy, sui-
le changes in the product-mix and
duced inventories helped the corpo-
on in a big way in coming out of
red. The ammonium sulphate and
prolactam plant, which is now being
mmissioned, would also contribute
FACT's financial recovery in the
ming years, taking the corporation's
al turnover to over Rs. 600 crores
1989.

The output of this project would be
000 tonnes of caprolactam per an-
n and 225,000 tonnes of ammoni-
sulphate per annum. With an in-
tment of Rs. 260 crores, the plant
technological collaboration with Sta-
carbon and Chiyoda would be the
cond such plant in the country after
Gujarat State Fertiliser Corpora-
n (GSFC).

With over 60 per cent of total pro-
t implementation work already com-
ted, the caprolactam plant is all set
be commissioned in another year.
eign aid to the tune of Rs. 80 crores
m the Overseas Economic Co-opera-
Fund (OECF) of Japan has been
ained for this project. The cap-
ctam plant would provide a new
rce of raw materials for the nylon
synthetic fibre industry.

The caprolactam plant would add to
various plants of FACT at Udyog
ndal and Ambalamedu in Cochin
capacities of ammonia (860
), sulphuric acid (1760), Phos-
ric acid (460), ammonium sulph-
(600), factamfos (450), ammoni-
chloride (75), super phosphate
(150), Urea (1000), and NPK (1600) besides a captive power plant of 14 mw, effluent treatment plant and pollution control plant.

HALDIA PETROCHEM BOARD BEING EXPANDED

The board of Haldia Petrochemicals Limited, an ambitious joint sector project in West Bengal, will soon be expanded with the induction of one more member from Mr. R. P. Goenka's family. Mr. Sanjiv Goenka, deputy managing director of Dunlop India Limited, will be co-opted on the board at the next meeting to be held in Calcutta.

With this induction, the strength of the board will be seven. At present, Mr. P. C. Banerjee and Mr. Subir Dutta are on the board as representatives of the West Bengal Industrial Development Corporation (WBIDC), one of the promoters of the project. The other state government nominees on the board are Mr. S. N. Roy and Mr. P. K. Sarkar. Another board member, Mr. V. G. Rajadhya is representing the Planning Commission. On behalf of the private sector promoter, the lone representation has since been made by Mr. R. P. Goenka.

Meanwhile, Mr. R. P. Goenka has gone to West Germany for detail discussions with the foreign collaborators who will be supplying not only the know-how but also plant and equipment for the project. He may be visiting a few more countries in Europe for this purpose. Letters of credits are understood to have been opened in favour of the foreign suppliers.

According to Goenka family sources, there is no hassle now to begin civil construction work. It is learnt that tenders will shortly be floated for different types of specialised civil jobs. The civil construction work is expected to start from January, 1988. The sources feel that the laying of a foundation stone is not a big issue now. The major concern should now be to press the state promotional agencies to act quickly and efficiently to complete the project in the scheduled time. The estimated cost of the project having alrealy gone up to about Rs. 1,450 crores, minimising cost escalation is now of utmost importance.

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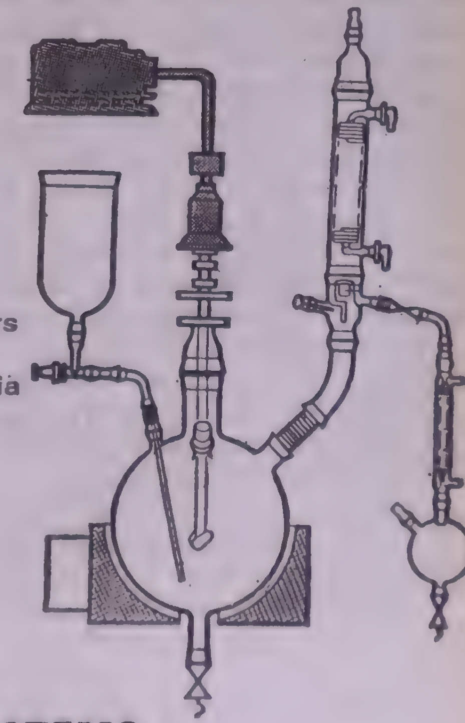

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Gleaning from the press

INDIAN OIL CORPORATION A FAIR RECORD

The Indian Oil Corporation Ltd., one of the world's largest corporate giants, continues to grow and make profits. In 1986-87, profit (after tax) rose by as much as 232 per cent over the previous year to Rs. 428 crores. When compared with a large number of losing units in the public sector, IOC's record is impressive. But much of its profit has its roots in the pricing policy for oil products laid down by the authorities and the monopoly position of the public sector in the oil industry. The turnover of IOC rose by Rs. 1,500 crores to a whopping Rs. 12,827 crores. IOC is the sole canalising agency for oil imports and is active in both refining and distribution. The increase in turnover has come about despite the decline in the value of imported crude. The total imports of crude oil rose from 15.24 million tonnes in 1985-86 to 15.81 million tonnes in 1986-87, but their total value fell from Rs. 3,494 crores to Rs. 2,030 crores. World oil prices have since recovered and IOC's import bill is, therefore, bound to go up this year.

As regards its other activities, IOC has done well in keeping up the capacity utilisation ratio of all its six plants at peak levels for the third year in succession. Against the total refining capacity of 20.45 million tonnes, the throughput last year was well over 21 million tonnes. IOC's exports of crude oil came to a halt last year, which only meant that the existing domestic refineries have built up adequate capacity to refine indigenously produced oil. Its exports of fuel products improved from 1.8 million tonnes in 1985-86 to 2.3 million tonnes last year, but export earnings fell from Rs. 450 crores to Rs. 355 crores.

The LPG consumers have some good news. The Indane customer population has gone up by 8,15,000 last year to 6.37 million by March 1987. The number of Indane consumers is planned to be raised to 8.7 million in the next three years. The pace of LPG consumption has been growing in rural areas and, therefore, there is a greater need today to educate the new customers about the safety aspects of LPG use and methods of preventing wastage of gas. In IOC's R and D programme, these customer-oriented functions have not received much attention. This deficiency needs to be remedied.

— **The Economic Times**

CSIR AND TECHNOLOGY

Seven months ago the Abid Hussain committee submitted a report on the working of the Council of Scientific and Industrial Research (CSIR). One of its recommendations was that the R and D laboratories under the council's purview should be transferred to "user-ministries". The committee had argued that the kind of research going on in those labs was unrelated to the needs of industrial growth. Predictably the proposal raised a storm of controversy with scientists, especially the directors of the laboratories. The scientists have found an ally in their fight. The scientific advisory committee to the Cabinet (SACC), the highest advisory body on science and technology in the Prime Minister's secretariat, has rejected the Hussain committee recommendation and opted for the R and D labs remaining with CSIR.

No one can deny the need for scientific freedom and the need for some distance between ministries and scientists doing research. But one should place this against the perspectives with which CSIR was set up and its performance. The record of CSIR and its laboratories in expanding the field of technical innovation has been dismal. The Abid Hussain committee is not the first to note CSIR's sorry record in this matter. Over the last two decades two committees have evaluated the work in CSIR and come to the same conclusion as that of the latest committee. Similarly, the view that the laboratories should be linked to "user-ministries" has also been aired in the past. In fact the Janata government tried it, unsuccessfully as it turned out.

The problem will remain till a clear policy for turning research into technical innovation is spelt out. One has to look beyond the immediate issue of the relative autonomy of CSIR labs. The question is one of relating research to economic growth. It is a pity that such a focus has not evolved so far. Arguments for scientific freedom have to be balanced with the need fo the laboratories to contribute the mite to industrial growth. And i this context, the Abid Hussain committee's recommendation that CSIR laboratories may finance a third of the expenditure from research sponsore by industrial users merits consideration. If the link between the scientist and the entrepreneur has been tenuou the mutual suspicion of each other' utility is to blame, to a large extent. good portion of the blame should als be borne by the government which ha to date not followed a consistent pol cy in this matter. Very clearly a polic outlining closer co-operation betwee science and commercial technolog has to be evolved.

— **The Economic Time**

20,000 TONNES OF DMT IMPORT MAY BE ALLOWED

The Union government is cons dering to allow initially an import about 15,000 to 20,000 tonnes of d methyl terepthalate (DMT) in order t ensure adequate supply of Polyeste Staple Fibre (PSF) and filament yar to domestic consumers as also t meet expected additional need for exports.

The authorities are concerned ove the DMT supply position in the country and its likely repercussions on th supply and price position for larg number of spinners and weavers.

Already two PSF plants have closed down earlier this month for wan of raw material and the situation i one more unit is reportedly critical. may also have to down shutters, DMT, the vital raw material could no be supplied in time, according to industry sources.

Out of the three indigenous DM manufacturers, the production at Bo gaingaon refinery's DMT plant has bee affected for want of their raw material and the major DMT supplier Bombay Dyeing is reportedly considerin shut down next month for maintenance. The present stock position wit DMT manufacturers as well as consumers is very tight and it is expecte to worsen further, unless urgent step are taken by the government to mee the situation, the sources added.

The recent meetings to review DM supply position as also to discuss export of polyester fibre and yarn hav clearly emphasised the need to au

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MANDATORY JUTE PACKAGING ORDER

mini cement units in distress

The mini cement industry in Orissa finds itself in a tight spot, faced on the one hand with appeals from Ipicol and the state government to support the state's HDPE woven sacks units and on the other with the latest order of the Central government making it clear that the mandatory jute packaging covers the mini cement sector.

Meanwhile, the HDPE woven sacks industry in the state is on the verge of challenging in court, the compulsory use of jute for packaging of cement and fertiliser, according to industry sources.

A spokesman of the mini cement industry pointed out that the local market, which is the mainstay of the mini plants, is being lost to the bigger cement plants as a result of the failure of the Central government to grant exemption to the smaller units from mandatory use of jute bags to the extent of 70 per cent of their requirement. This is because the bigger cement plants now tended to flood the local non-levy market with 100 per cent of polybag cement supplies, even while observing the norm of 70 per cent jute packaging in their overall marketing. This was easier for them since the bigger plants were even earlier using jute bags for their levy quota while the mini plants were exempt from levy. Thus, in the non-levy market where profits are maximum, the big plants mandatory jute packaging comes to only about 40 per cent, and even within this limit they are able to supply the local market with 100 per cent of polybag supplies.

The mini cement plants, on the other hand, find that with their concentration of market largely in the local area, packaging has to be switched over to jute to the extent of 70 per cent against nil at present, while the rest of the supplies, viz, 30 per cent, does not even allow an economic batch size for a single unit. It is not worth incurring costs of polybag packaging, printing etc for a small share of the local market, that too when the bigger plants are flooding their polybag cement supplies at lower costs. The overall result, ironically, is that the local market is dominated by big-

for the market 100 per cent in jute bags and thus incur losses or else keep away from the market and shut down production, the industry spokesman told **"The Economic Times"**.

The mini cement plants in Orissa, who have been asked by Ipicol through its letter written in the first fortnight of September, have in turn told the corporation that it would not be possible to do so unless the mini plants are exempt from the packaging order as in the case of levy quota.

Orissa has two big cement plants, the Hira cement works, Bargarh, run by the Industrial Development Corporation of Orissa Ltd. (Idcol), and Orissa Cement Ltd., Rajgangpur, while several mini plants ranging in capacity from 25 tonnes per day to 200 TPD have come up in the last few years.

Meanwhile, according to Mr. H. K. Mohanty, president of the Orissa HDPE Woven Sacks Manufacturers Association, the eleven plastic sack units in the state promoted with Ipicol, OSFC and IDBI assistance are working at an average of 15 per cent capacity, and there have been no orders since the beginning of September.

The industry being of very recent origin in Orissa (the first of the units was commissioned in early 1987), and promoted by first generation entrepreneurs, it needed support.

chemical pollutants posing serious problems

Pollution, depletion of natural resources and degradation of environment have joined computers and space exploration as the most talked subjects of the day. The concern for the deterioration of environment, once held to be the problem for the affluent countries, is rapidly assuming a menacing proportion in developing countries too, such as India.

According to the Central Board for the Prevention and Control of Water Pollution, "out of the 1700 pollutionally significant industries in India, only 460 have operational effluent treatment plants, and in 250, treatment plants are under construction or under planning. The remaining have been discharging their effluents directly into public sewers or rivers.

The mere establishment of a treatment plant does not necessarily provide a complete control of pollution. The industry has to monitor continuously the effluent released into the environment.

According to experts, chemical sector ranks first among the polluting industries because a large number of pollutants are potentially hazardous to life — creating havoc and destruction.

Even in smaller towns the prevailing atmospheric pollution is no less than major industrial cities. For instance, air in Ambernath, an industrial town 60 km. from Bombay, is so highly contaminated by

been suffering from chronic asthma and other deletenius health effects.

There cannot be greater threat than doctors inability to mitigate the sufferings as medicines have no effect in an atmosphere laden with toxic chemicals. According to doctors practising in Ambernath, most of the pollution has been causing intense burning and watering of eyes and other problems.

The emissions from the chemical industries have become health hazards. There is hardly any family which has not been afflicted with some ailments. The cost of medicine is more than the prosperity of the residents.

The problem at Vellore in Andhra Pradesh is also vexed. The residents experience sore throat, burning of eyes, headache and throat irritation whenever the atmosphere is filled with pollutants emitted by zinc smelter, petroleum refinery and fertiliser industry.

Frequent temperature inversion, particularly in winter, further aggravate the pollution potential. In a major temperature inversion in December 1986, the entire city was engulfed by noxious gases, causing a number of ailments. Even dogs were found restless.

According to a study by Industrial Toxicology Research Centre (ITRC), Lucknow, petrol pumps, repair workshops and garages are also polluted with metals like chromium, copper, manganese, cadmium, years may cause health problems among the workers.

According to W.H.O., exposure of women to certain chemicals before conception may cause spontaneous abortion, still births or birth defects. There are significant instances of low birth weight among the children of women working with smelting materials, which have arsenic contents and other potentially toxic substances.

More bleak is the scenario in metropolitan towns and big industrial cities of Bombay, Calcutta, Madras, Delhi, Kanpur, Ahmedabad and Pune.

Yet, there are trace metals such as lead, zinc and fluoride which are essential to life even-though they occur only in trace amounts in the atmosphere. But these metals can be toxic when they are present above a given concentration.

For instance, the level of lead has been increasing alarmingly in Bombay. A study by Dr. U.C. Mishra of BARC says, "the lead emission from automobiles in Bombay was 250 tonnes in 1980, while in 1984 it reached to 300 tonnes, according to present projections, by 1995 it would be 650 tonnes per year."

Even after the Bhopal gas disaster, neither the Government nor the industry have learnt any lesson to store large volumes of extra hazardous chemicals in densely populated areas. An environmental safety committee set up by Maharashtra Government under the Chairmanship of Dr. R. K. Garg of the Bhabha Atomic Research Centre (BARC), had recommended that storage of intermediate products which are hazardous in nature should be restricted to eight hours requirements and before any plant is shut down all such intermediate products should be consumed.

However, contrary to the recommendation, a large scale storage facility for 50,000 tonnes of extremely hazardous chemicals is under construction in the heart of Bombay.

Though chemical industry is one of the fastest growing sectors in the country, producing nearly 13 per cent of the total industrial production, employing over four million workers, it still lacks a coherent environmental policy.

Worse still, as much as 47 per cent of the chemical industries in the country lack proper first aid medical rooms, 73 per cent have not instituted periodic health checks for their employees.

Growing recognition of the menace of environmental pollution produced a series of legislation and setting up of pollution control boards in all the States. However, instances of industries which have been prosecuted by boards for violating pollution laws are few.

Indeed, in a recent case Justice Mr. U. C. Shrivastava and Justice Mr. Brijesh Kumar of Allahabad High Court recorded, "UP Board had been slack in the use of its emergency powers under the Pollution Act and the writ petition by the Board is an hurried attempt to avoid criticism and to cover up its failures."

GSFC TO SET UP DESALINATION PLANT

The coastal DAP plant of the Gujarat State Fertilizers Company at Sikka is likely to get a desalination plant for rendering sea water suitable for industrial use.

Talking to reporters, Mr. Moosa Raza, GSFC's Chairman and Managing Director, disclosed that the company was examining the proposal to set up a desalination plant to overcome the difficulty of water shortage for the coastal DAP plant. The proposed plant would be based on the latest membrane technology from the US and would cost around Rs. 2.5 crores.

The capacity of the plant would be around half-a-million gallons per day and it would be the first of its kind of this size in the country, he added.

He said that the Saurashtra sea waters had as high as 40,000 PPM, high, for the type of desalination plant envisaged by GSFC, 5,000 PPM to 10,000 PPM will be most ideal and efforts were being made to locate a place suitable to utilise the membrane technology.

He hoped that with the establishment of this plant, the water shortage for industrial use at the sikka coastal plant would be permanently overcome.

Asked whether a similar desalination plant, to relieve the shortage of drinking water for Jamnagar, was possible, Mr. Raza replied that such a proposal had been already discussed and the estimated cost of the plant was expected to be around

He said that such a huge project wi be set up only in active collaboration with other like-minded institutions and if they came forwar to share the financial responsibilit GSFC was ready to participate i the project.

Mr. Raza said that GSFC had accepted the challenge of development by establishing the Rs. 10 crore coastal DAP plant in Jamnagar district, an area perenniall affected by water shortage. Whe agriculture was not possible in suc an area, development of the industry was the only alternative to enhance the prosperity and growt opportunities.

COPPER, NICKEL PRICES HIKE

The Pricing Committee of th government has increased the MMTC's selling price of copper an nickel.

According to an official press release, the prices of copper and n ckel have been increased due rise in international prices and appreciation of pound sterling vis-a vis Indian rupee.

While the prices of lead have al been increased, there is a margin decline in the prices of zinc, t and antimony metal.

The price of electrolytic copp wire bars and high grade cathod has been increased from Rs. 57,0 a tonne to Rs. 61,000 a tonne, co tinuous cast copper wire rods fro Rs. 65,560 a tonne to Rs. 69,500 tonne, pig lead 99 per cent from 21,420 a tonne to Rs. 21,500 a ton and pig lead 99.99 per cent fro Rs. 21,620 a tonne to Rs. 21,700 tonne.

The price of nickel briquettes h been increased from Rs. 1,43,690 tonne to Rs. 1,52,000 a tonne, nick squares from Rs. 1,43,690 a ton to Rs. 1,52,000 a tonne, and nick pellets/F. shots/strips from 1,45,690 to Rs. 1,54,000 a tonne.

The price of electrolytic hi grade zinc has been reduced fr Rs. 31,570 a tonne to Rs. 31,500 tonne, special high grade zinc fr Rs. 31,670 a tonne to Rs. 31,600 tonne, tin from Rs. 1,93,020 a to to Rs. 1,93,000 a tonne, and antimo metal from Rs. 71,820 a tonne to 70,000 a tonne.

The prices are effective from

& D PROJECTS

CSIR seeks Rs. 200 cr. additional fund

The Council for Scientific and dustrial Research (CSIR) has ught an additional allocation of . 200 crores for the modernisation d upgradation of its laboratories, r R and D projects in the frontier eas and assisting in the five tech- logy missions set up under the inistry for Science and Technology.

The council, in a bid to accord ontinuity and greater autonomy to he CSIR laboratories, has also worked out a three-year budget overing the Seventh Plan period. t is for the first time that the prac- ics of annual budget has been given up according to the director-general of CSIR, Dr. A. P. Mitra. The decision to have a three-year budget was decided upon to facilitate the functioning of the laboratories and give them greater financial flexibility and autonomy. Dr. Mitra was talking to newsmen on the 45th anniversary of the council. The council was set up in 1942 and has 60 leading laboratories under its umbrella. These laboratories cover wide ranging disciplines with research activities extending from mines in the interior of the earth, oceans including Antarctica, to upper atmosphere, aeronautics including wind tunnel, studies of space vehicles, food products, building materials, sophisticated instrumen- ations and electronic circuitry.

Mr. Mitra said that CSIR labora- ory, NAL, at Bangalore proposed o build a ocean-going vessel with he help of some ship building wards including the Garden Reach. t would take a few years before ts indigenously built vessels would e manufactured in the country.

The council has also organised an xhibition on the occasion. Pointing ut the highlights, Mr. Mitra said that recently NAL had manufactured light canard research aircraft sing composite materials.

The National Institute of Oceano- raphy, Goa (NIO) has been at the orefront for winning poly-metallic odules from the Indian Ocean. Its researches have brought India the status of pioneer investor. Central Fuel Research Institute (CFRI)'s work in the upgradation of Indian coal has considerably brought down the import of high grade cooking coals. Thanks to researchers at the Central Glass and Ceramic Research Institute, Calcutta (CGCRI), India is in a position to meet its requirement of the strategically important optica glass. Achievements of Indian Institute of Petroleum, Dehradun (IIP) in the major resources oil have also been shown in the resources section of the exposition.

import duty cut for 120 items

The Union government has announced an exhaustive list of 120 items which can be imported at concessional rate of customs duty under the technological upgradation scheme of the Industrial Development Bank of India (IDBI) to facilitate modernisation of 10 basic captive goods industries.

The 10 basic industries which qualify for concessional rates of customs duties include power generation equipment, machine tools, foundry equipment, forging equipment, metallurgical machinery, mining machinery, chemical machinery, sugar mill machinery, rubber machinery and food processing machinery industry.

The components for these basic industries which will be allowed to be imported at a concessional rate of duty of 35 per cent, as announcement by the department of revenue in the finance ministry, comprise 53 in number for the power generation sector, 21 for the machine tool industry, 15 for the foundry equipment industry, 14 for the forging industry and 17 items for the remaning six basic industries of metallurgical, mining, chemical, sugarmill, rubber and food processing machinery industries.

The government has also announced the procedure for import of such components under which the importer will have to get a certificate from DGTD to the effect that the goods being imported are for his actual use, a certificate from IDBI to the effect that the components being imported are covered under the technological upgradation scheme of the IDBI and finally an undertaking by the importer that the goods so imported will be used by him as specified in the notification, failing which he shall be liable to pay an amount equal to the difference between the duty leviable on such imported goods and the concessional duty already paid at the time of importation.

The items which have been allowed to be imported are for the mfr. of power-generation equipment comprising boilers, turbines, generators and their auxiliaries such as condensers, heat exchangers, coal mill, electrostatic precipitators, instrumentation and control systems.

The goods allowed at concessional duty imports for the manufacture of foundry equipment include plastic moulding pattern, moulding equipment for making moulding out of polymers, microprocessor-controlled sand mixing miller, electronic sand testing equipment, equipment for analysing gases like oxygen, hydrogen and nitrogen; on-line radiography equipment, for analysing gases like oxygen, hydrogen and nitrogen; on-line radiography equipment, ultrasonic testing equipment, magnetic particles testing equipment, portable hardness testers; automatic core sheeter; high pressure short squeeze moulding machine above 10 kgs. ½ cm. two continuous mixers for resin bonded sands, three dimensional co-ordinate measuring machine, mouldability meter for sand mixers, pneumatic or hydro-pneumatic weighing system for liquid metal pouring.

commercial deep-sea mining by 2010 AD

The earliest that India can start commercial mining of polymetallic nodules is 2010 AD, according to the principal scientific officer of the Department of Ocean Development, Mr. Bhimsen Rao.

Mr. Rao said, that as per a time-schedule drawn up by his Department, the pilot plant (metallurgy) would be ready by 1990, while development of technology and its acquisition was slated to begin by 1995. The test mining system would be commissioned by 1996, culminating in commercial mining by 2009/2010 AD.

Exploitation of polymetallic nodules which contain manganese, copper and nickel besides other metals, and lie smeared on the ocean beds of the world, became a distinct possibility for India, only in August, when the Preparatory Commission of the United Nations Convention on the Law of the Seas (PREPCOM) registered India's application for deep sea mining.

India is the first country to have been granted the pioneer status in deep sea mining. It gives the country the exclusive right to explore, and later, commercially exploit an area of 150,000 sq. km. of the Central Indian Ocean.

Among the newly discovered underwater resources, polymetallic nodules lie scattered on the ocean bed at a depth of 3,500 to 6,000 metres.

Commenting on the economic viability of a deep sea mining project, Mr. Rao said that a study done by the Massachussetts Institute of Technology (MIT) in 1983 had projected a real term, non-inflated internal rate of return of 9.21 per cent within 25 years of commencement of mining.

The MIT study considers an eight phase mining process, which includes transport, processing and waste disposal and estimates an annual capital cost of $ 1,121.02 million, and an operating cost of $ 217.03 million. The major components of these costs are the processing costs, followed by the mining cost and the cost of transportation.

A more recent study done by the US Department of Interior Bureau of Mines in 1985, predicts an after tax rate of return of only 7.38 per cent and 6.63 per cent respectively for three and four metal recoveries. In the three metal scenario only copper, cobalt and nickel would be extracted, whereas in the case of four metal extraction manganese, in the form of ferromanganese, would also be recovered.

In this study, the mining cost per dry metric ton of ore has been estimated at US $ 25.50 and the transportation cost has been put at US $ 12.23.

. But Mr. Rao pointed out that these were only estimates that were based on assumptions. Wide variations could take place during tests as had been shown by the 1983 MIT model which gave a range of 21.6 per cent to minus 6 per cent rate of return for optimistic and pessimistic scenarios.

The morphology of the sea floor is mountainous with crevasses and escarpments, rather than the undulating plains as it was thought to be earlier. Underlining this asp
Mr. Rao said that exploration
nodule deposits and their collec
and exploitation would, theref
require new technologies that
to be applied under adverse envir
ments.

Referring to a paper prepared
an expert from West Germany,
of the front line states in respec
ocean mining technology, Mr.
said that the main aspects wh
any technology would have to
mindful of were: positioning
vessel, exploration, ore collect
ore lifting, setting up of an
platform, offshore processing, tra
portation and onshore processing

However, though many count
had been working on different
pects of ocean mining technolo
no one has been able to fully w
out a technology that would m
commercial mining feasible, keep
all the above aspects in mind.

banned pesticides still in use

Several pesticides which are banned or on the restricted list in industrialised countries abroad continue to be used in India.

Of the pesticides which have been put on either the banned or restricted lists in the US and in the EEC countries, as many as 11 are still in use in India.

These 11 pesticides are dieldrin, EDB, sodium cyanide, BHC, aldrin, chlorodane, heptachlor, 24-D, chlorobenzilate, DDT and lindane.

Of these 11 pesticides, BHC, sodium cyanide and dieldrin only are banned in the US. In India dieldrin is approved only for use by the plant protection adviser against locusts in the scheduled desert areas. Sodium cyanide is used for fumigating imported cotton bales.

Although a committee was set up as long ago as in August 1984 to examine the continued use in India of banned or restricted pesticides abroad and although it has submitted reports on DDT, BHC, aldrin, dieldrin, chlorodane, heptachlor and EDB, the report on only BHC has been accepted and the others are still under consideration.

Some studies conducted by universities and other institutions have shown in samples of commodities like vegetables, cereals, pulses, oil
seeds, meat and fish, the presence
some pesticides like DDT and B

However, a survey conducted
der the FAO Food Contaminat
Monitoring Project in various p
did not reveal the presence of
cessive residues of pesticides in f
samples.

Permissible limits in the case
pesticides are technically termed
maximum residues limits and h
been fixed for a maximum of
pesticides under the preventior
Food Adulteration Act, 1954.

Apart from all the precaut
taken, in 1985 one death occu
in Haryana due to the accide
ingestion of aluminium phosph
In 1986, a total of 12 deaths
reported, these comprised two
cides and four accidental death
Punjab and six deaths in Gu
due to contamination of edible
with chloropyriphos.

The Central Plant Prote
Training Institute at Hyder
gives due emphasis on the
handling of pesticides during its
rious training courses. The Ce
plant protection stations and
tral surveillance stations under
Directorate of Plant Prote
quarantine and storage also
some villages where they hold
tical demonstrations and i

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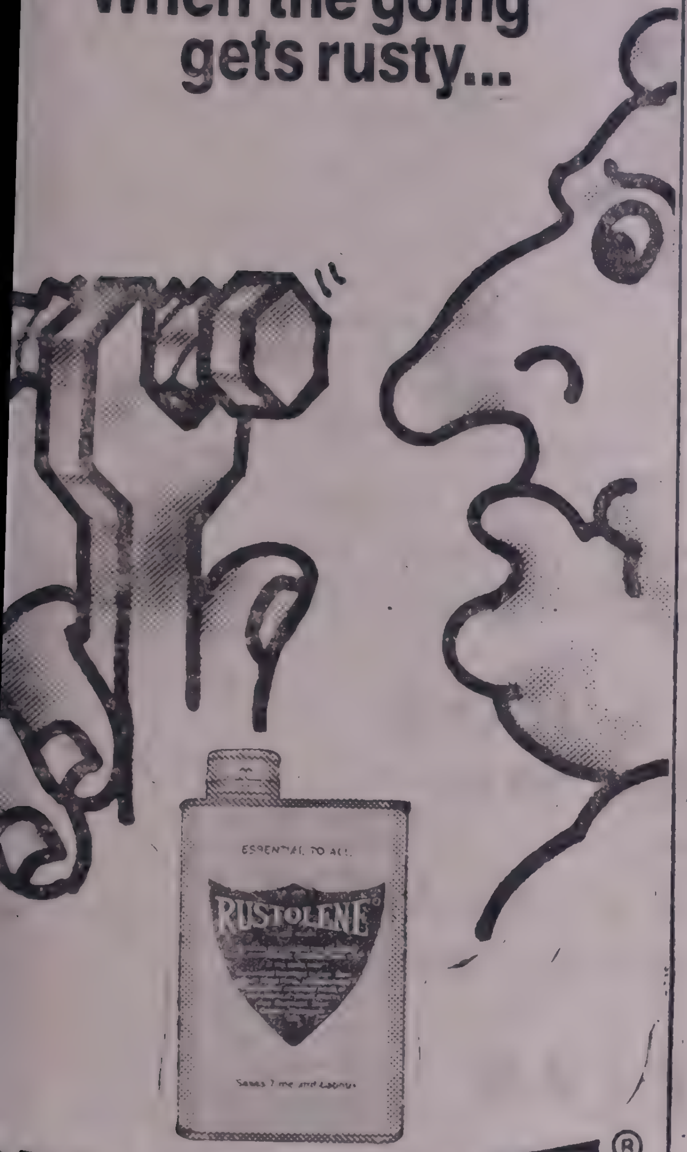

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UGS TRADE MARGIN ROW :

Govt. interference unlikely

he Union Government is likely to ain a mute witness to the triangul- row that is now taking place in the g industry involving the retail trade, olesalers and the manufacturing ts

he issue of the row is the trade rgin that should be paid to the re- lers and wholesalers by the drug nufacturers. The seriousness of the ue can be gauged from the fact t failure to resolve the row early throw the very functioning of the w drug price control order (DPCO) to jeopardy.

The Department of Chemicals and trochemicals has told the drug in- stry to sort out the tangle between and the trade through internal meet- gs and discussions without invol- ng the Government. It has argued at the Government has made its and on the trade margins clear rough the new DPCO announced in e last week of August.

According to this order, the trade argin should be paid by the indus- in the following manner: three per nt to the wholesalers and 17 per nt to the retailers for ethical pro- cts and 15 per cent to retailers for n-ethical products. This level of de margin is an improvement from o per cent for wholesalers and 12 r cent (ethical) and 10 per cent on-ethical) for retailers under the d DPCO of 1979.

Apparently, the wholesalers are not happy with the small increase in trade margin granted to them compared to the liberal hike allowed to the retailers. Their unhappiness is more because the implementation of the trade margins as per the new DPCO would in actual terms mean a 50 per cent cut in what the wholesalers were getting unofficially under the old dispensation.

The Department of Chemicals and Petrochemicals has asked the industry, wholesalers and retailers to mutually discuss and even agree on a revised norm for fixing the trade margins. But the total amount to be given by way of trade margins should in no way be more than the stipulated 18 per cent and 20 per cent for the entire trade.

In other words, the wholesalers and retailers could mutually agree on either a cut or an increase in their respective trade margins in consultation with the drugs industry within the overall trade margin limit.

According to reliable information, one of the alternative suggestions is to grant five per cent trade margin to wholesalers and 15 per cent to retailers. Under the old DPCO, wholesalers were getting about six per cent unofficially and two per cent officially, while retailers got 10-12 per cent as trade margin.

It is learnt this alternative suggestion has upset the retailers, for this would imply a cut in the margin for them from 15-17 per cent to 13-15 per cent. On the other hand, the wholesalers have stated that they would not be in a position to operate at a trade margin below what they were already getting.

The drug industry is thus in a fix as to how it should resolve the row. In fact, the industry has not yet applied to the Department of Chemicals and Petrochemicals for revising the drug prices as per the new DPCO as the trade margin row has not yet been resolved. The industry was expected to apply to the Government for price revision after a month of the announcement of the new DPCO on August 26.

The price revision had to be effected in terms of the new rates of maximum allowable post-manufacturing expenses (MAPE) at 75 per cent for category-I drugs and 100 per cent for category-II drugs. The new DPCO had also brought down the list of price controlled bulk drugs to only 166 and classified them into two categories.

According to official sources, the Department would be able to give permission to the drug units for revising prices as per the new formula within seven days of the submission of the application. However, no such application is expected till the contentious trade margin issue is resolved.

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Need for effective drug delivery system

India has emphasised the need for early establishment of an effective delivery system for medicines along with rationalisation of the production pattern and availability of drugs.

Addressing the third consultations on the pharmaceutical industry in Madrid, Mr. H. K. Khan, Secretary, Chemicals & Petrochemicals Department, said at present the production pattern was not rationalised and drugs were produced in areas where their requirement was less leading to a situation where only 24.4 per cent of the production was consumed in developing countries.

Mr. Khan said the main constraint was the availability of technology. The meeting was organised by the United Nations Industrial Development Organisation (UNIDO).

Mr. Khan called upon UNIDO to play a major role in correcting this imbalance and channelising assistance for availability of technologies. He felt that developed countries should lend technological support to the third world countries in building up a sound foundation for a self-reliant drug industry.

He also said there was enough scope for development in this industry. By the turn of the century, it was estimated that the demand for pharmaceuticals would be around $27,000 billion. The requirement of developed countries would be $14,300 billion and the need in developing countries would be around $9,277 billion.

He said the requirement of production would touch $84,000 million by the end of the century. In India the present production in pharmaceuticals was around $23,000 million. The target set for 2000 AD would be achieved through indigenous efforts and through absorption of technology.

Mr. Khan said there was a need to increase production in developing countries which was around 10 per cen of the world's production at present Greater integration and co-operatio amongst the developing nations them selves would also go a long way i the process of encouraging the dru industry.

He emphasised there was an equa need for a better co-ordination bet ween the different bodies of the Unit ed Nations dealing with the subject The World Health Organisation (WHO deals with quality control and regula tory aspects and UNIDO with the ma nufacturing and development.

The nature of this industry neces sitated greater interface between dif ferent bodies particularly while deal ing with the subject of irrational drug which was under the purview of WHO The integration among various group would solve many of the problems, h said.

He felt that the changes in the poli cy relating to drugs in India woul encourage the growth in a rationalise manner, ensuring availability of drug at reasonable prices to consumers There would also be scope for expor and sharing information with othe countries on development of technolo gy.

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HPC ORDERS GAS TURBINE PLANT FROM MITSUI

The Hindustan Petroleum Corpora tion has ordered a gas turbine plan from Mitsui Engineering and Shipbuild ing Company, a major Japanese ship builder, reports Kyodo.

A company official said that th Indian corporation would use the fo billion yen plant, with a maximu electricity generation capacity of 26 megawatts and an 82.4 per cent the mal efficiency, as a major electrici supplier to its refinery in Bombay.

Its main equipment, the waste he recovery boiler, would be supplied b the state-owned Bharat Heavy Electr cals Ltd., the official said.

The Tokyo-based company has su plied similar plants, also known "cogeneration plants," to other India state-run oil firms, he said, adding th the latest deal represented the thi such transaction involving

Economical method to produce hydrogen developed

A method developed by the Dornier System GmbH of Federal Germany seems to be the economical solution o the problem of deriving hydrogen, he energy source of the future, from water without having to invest a large amount of energy.

The classical method of producing hydrogen via electrolysis was used commercially for the first time years ago in Nuremberg. In this process the water molecule is split up by applying electrical charges. The process can be supported by adding potassium hydroxide, to name just one substance. However, to produce one cubic metre of hydrogen more than 4.3 kilowatt-hours of energy are required.

After years of research work the researchers in Dornier System were able to develop and successuflly tes a high-temperature electrolysis procedure which noticeably cuts down on the amount of energy required. Steam heated up to about 1,000°C is directed past a firm electrolyte and is split up into its components by an electrical charge. Although heating up water to produce steam naturally requires energy, there is a saving of energy, input in this procedure, known as Hot Elly, if one uses the heat emitted by a high-temperature reactor to give just one example. In addition, only firm electrolytes are known today which feature the required high conductivity at temperatures of 900°C and above and which can therefore separate this part of a molecule from the steam.

Only ceramic materials can resist these high temperatures for any length of time. Therefore, the first thing that had to be done was to develop a method of producing the material for the separation pipes. They are manufactured by transforming zirconium oxide, mixed with yttrium oxide, to fine-grained powder using the spray drying process. The powder is then moulded to form the final parts, which are subsequently vitrified.

An endurance test has recently proved the high efficiency of these reaction pipes. Whereas the maximum lifetime of firm-substance electrolytes used to be 500 to 700 hours of operation, the majority of the Hot Elly reaction pipes are still operational after as many as 3,000 hours or more.

High-temperature fuel cell

The information gained from the Hot Elly programmes is also expected to help advance the reversal process, that is, the so-called high-temperature fuel cell. In a fuel cell, hydrogen and oxygen are united in a "soft" manner — "soft" because the oxygen-hydrogen reaction which has to be expected otherwise is avoided. In the high-temperature fuel cell, a zirconium oxide membrane, which is premeable to oxygen ions is responsible for this. Oxygen from the air settles on a thin contact layer, is charged electrically, and then moves through the membrane to the side of the reaction cell which contains hydrogen. There, the two substances are combined. This process creates an electric current which can be funnelled off via appropriate contacts.

The high-temperature fuel cell is particularly interesting because in principle it can "use" any fuel gas, including natural gas or synthesis gas, which can be produced from the gasification of coal. The process makes it possible to increase the efficiency of natural gas by more than 60 per cent and that of synthesis gas by some 50 per cent.

SANGLI DRUG PRODUCERS' STIR THREAT

Pharmaceutical manufacturers in Sangli and Kolhapur districts have threatened to down their shutters if the government did not redress their grievances.

They have decided to set up a state-level body on October 11 to fight the state's Food and Drugs Administration which, according to them, is harassing drug manufacturers.

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NCL to organise workshop on heat pumps

An Indo-British Workshop on Heat Pumps and Energy Conservation will be held at the National Chemical Laboratory (NCL), Pune, India, between 2 and 4 March, 1988. The workshop is being organised jointly by NCL and the University of Salford, U. K. The aim of the workshop is to give a realistic appreciation of the availability and potential of heat pump technology and their relevance to India. Experts from NCL and four British experts will give lectures on various aspects of the heat pump technology, which will be supported by demonstrations of the various heat pump units installed at NCL, including a water-to-water heat pump, a heat pump assisted dryer and a heat pump assisted distillation column.

During the past few years, NCL in collaboration with the University of Salford, under the sponsorshop of the Overseas Development Administration (UK), has developed considerable expertise in this technology. The objective of this workshop is to share this expertise with the Indian industrial community. Since heat pumps bring about substantial savings of energy by upgrading and recycling waste heat, the workshop will be of great interest and relevance to engineers and managers of a variety of industries. Advanced countries have already benefitted greatly by introducing heat pumps in various processes and unit operations. Besides the opportunity to listen to lectures and see demonstrations, the participants will also get a chance to hold discussions with a panel of experts and special invitees from energy related government agencies.

Three short courses have already been held at NCL in the earlier years and the participant's responses proved that Indian industry's interest in this emerging technology is growing at an encouraging pace. As the number of participants is to be restricted, an early registration is desirable. For further details please contact: Dr. S. Devotta, Chemical Engineering Division, National Chemical Laboratory, Pune 411 008.

GIL TIES WITH FRG FIRM

Gujarat Inject Ltd. (GIL), a company manufacturing several unique lifesaving intravenous fluids, has concluded an agreement with a West German firm, Fresanius AG for technical and financial collaboration to put up a project in India. Fresanius, established over 75 years ago and engaged in the manufacture of disposable medical FX products, dialysis equipments and disposable dializer, has seven plants world-wide with an annual turnover of over Rs. 400 crores.

For setting up the high technology plant to manufacture products not presently produced in India, the foreign collaborator will invest 25 per cent of equity and will buy back minimum 25 per cent of the production.

GIL, after successfully completing the trial production, has gone into commercial production and has achieved over 70 per cent of the rated capacity within the first week itself. GIL has commenced marketing of its products initially in Maharashtra, Gujarat and Rajasthan and has already achieved a turnover of Rs. 10 lakhs. GIL also has sufficient orders on hand.

The new Drug Price Control Order, as amended, has further strengthened the profit prospects of the company since it will be able to sell their products at higher prices than projected earlier as a result of revision in markup allowed under the order. The cost of plastic raw materials will be substantially reduced due to sizeable decrease in import duty on polyethylene which has recently been announced by the Union Government.

DISFERSION KNEADER FOR RUBBER COMPOUNDING DEVELOPED

A dispersion kneader for rubber compounding has been indigenously developed by Harsh Auto Industries of Delhi.

The mixing process is different from the conventional open type mixer. Here, mixing is done under pressure to provide in process compounding effect and impart higher homogeneity to the mix

The design of the reverse directional blades, their profile, helix angle and surface treatment and the profile of the pressure lid are computed to impart optimum dispersion and mixing effect during kneading. This also increases the productivity substantially.

The machine has wide applications in rubber industry for rubber compounding, gasket, automobile tubes and tyres, battery shell compounds, shoe soles and chappals, V-belts, tread rubbers, automobile parts and micro sheets.

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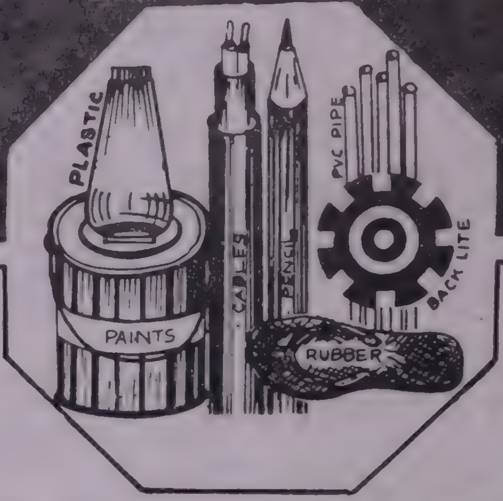

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Malaysia may turn importer of crude

With the depletion of international l reserves, Malaysia may become a t oil importer by the end of this ntury.

Malaysia's oil reserves as on Janu-y one, 1987 which was about 2.9 illion barrels represents a decline of bout 100 million barrels from last ear's total of three billion barrels.

Malaysia oil prices for the first half f this year averaged $460,000 bilion or $600,000 billion below its lanned level of $520,000 billion.

According to official figures, it is orecast that Malaysia may become a et-importer of oil by about 1996.

The supply side is expected to be restructured, with a substantial increase in the use of gas, coal, and hydro power to meet Malaysia's energy requirements, accompanied by a corresponding decline in oil.

According to latest studies, oil accounted for about 60 per cent of Malaysia's total primary energy supply in 1986. Gas was second at 19 per cent, followed by biomass, comprising firewood and oil palm waste used by small-scale industry in rural areas at 13 per cent, hydro at seven per cent and coal three per cent.

Oil continued to shrink from 81 per cent in 1981 to 62 per cent and 60 per cent in 1985 and 1986 respectively. As result of the further drop in 1986, the country's oil consumption at about $173,000 billion is almost back to the 1931 level of $171,000 billion. Gas continued to show the argest gain in Malaysia's energy supply structure with its share in 1986 growing to almost 19 per cent from 17 per cent in 1985. The continued growth was due to increased use of gas o replace fuel oil in power generaion.

For the period 1987 to 2000, Maaysia's energy demand is projected to grow at an average rate of around four per cent per annum. This forecast was based on the assumption that Malaysia's economy would grow at an average rate of about 3.4 per cent per nnum during that period.

Malaysia's hydro resources have een assessed at about 123 terawattours (TWH) per year. However, to late only about five to six per cent WH have been exploited.

The coal reserves of the country are currently estimated at round 500 million tonnes and are mainly in the Sabah and Sarawak states. However, proven reserves to date are only about 30 million tonnes and most of them are subbituminous or lignite with low heating value and high-moisture content.

Malaysia's primary energy demand pattern took an about-turn in 1986 against an almost eight per cent annual growth experienced between 1981 to 1985. Total energy consumption last year dropped by two per cent due to the country's sluggish economy which grew by only one per cent in 1986 after experiencing a negative one per cent growth in the preceding year.

The industrial sector continued to be the largest consumer accounting for 43 per cent of the total demand. The transportation sector was second at 30 per cent followed by power generation at 22 per cent.

Malaysia's petroleum product demand till the year 2000 is projected to grow at an annual rate of about two per cent. However, the country expects a temporary increase in demand for 1990 because fuel oil will be relied upon to meet all additional demands in the power sector during that year.

ONGC ACHIEVEMENT IN VAPOUR RECOVERY SYSTEM

A saving of Rs. 1 lakh per day (Rs. 3.5 crores per annum) by the Oil and Natural Gas Commission (ONGC) has been achieved in the process unit of the Ankleshvar central tank farm in the Cambay basin of Gujarat.

The scheme, first of its kind in the country, has been achieved entirely through the innovative efforts of ONGC's engineers and technicians.

The petroleum process plant — the central tank farm at Ankleshvar — had no system for recovery of rich gases below 0.5 atmospheric pressure. After the last stage separation the gases used to be sent to the compressor and oil to the water-settling tanks of the desilting plant. The associated gas, including tank vapours in the oil, could not be separated (about 27,000 cubic meters of gas).

The LPG plant at Ankleshvar with a capacity of 140 tonnes per day, commissioned in early 1986, made a provision to use the tank vapours vented till then, amounting to nearly 27,000 cubic metres daily. Thus all the gases produced in Ankleshvar, irrespective of the stages, are now fed to the LPG plant.

Initially, an outside agency was authorised to prepare a tank vapour recovery scheme for the whole of ONGC. As per the scheme submitted by it, it would have taken one year to complete. However, due to the commissioning of the LPG plant it was necessary that the vapour recovery scheme also be developed alongwith it because of the high LPG content (about 65 per cent) of the vapour.

ONGC's engineer's developed a scheme which in design was simpler than the one proposed earlier by the consultants and was completed in record time. The vapour recovery vessel, designed by ONGC's own engineers, was fabricated at the central workshop in Baroda.

The crude from the various group gathering stations comes to the Ankleshvar central tank farm's horizontal separators installed at a height of 13.5 metres. The separators are operated at a given pressure. The separated gas is directed to the compressor plant and the oil to the settling tanks of the desilting plant.

The challenging task was, however, to recover the vapours from the separated oil. For this, a tapping has been taken from the oil line between the horizontal separators and the settling tanks.

CYANAMID INDIA

Cyanamid India proposes to launch a major herbicide to strengthen its presence in agro-chemicals and is also exploring the possibility of participating in a major export-oriented, venture.

The company has been engaged in manufacturing and marketing drugs and pharmaceuticals and agro chemical products for over three decades. Through its affiliation to American Cyanamid Company, US, Cyanamid India's products have achieved international standards in health care. The company has also made significant inroads in developing safe and effective pesticides for enhancing the production of important food grains such as wheat and rice

Tripura emerging as big onshore gas field

The Tripura basin is emerging as a major onshore gas field in the country, according to Oil and Natural Gas Commission.

Till now, commercial accumulation of gas has been discovered in all the 4 structures (Baramura, Gojalia, Rokhia and Agartala Dome) taken up by ONGC for drilling. As on January 1, 1987, the prognosticated resources of oil and oil equivalent of gas in this basin are estimated to be 831 mmt.

In order to utilise the gas potential from the region for the development of the Tripura state, ONGC has started supplying gas from March, 1986 to the Tripura State Electricity Department (TPSED).

Uptill September 1, 1987, 31.15 million cubic metres of gas has already been supplied to TPSED. ONGC has already committeed to supply one million cubic metres of gas per day by 1989-90, which could be augmented to three million cubic metres by 1993.

As per a preliminary study conducted by ONGC, the total gas consumption potential in Tripura is estimated to be around 4.4 million cubic metres per day. Out of this, around 1.24 million cubic metres per day could be used as fuel. While the rest could be utilised as feedstock for the fertiliser, methanol and other industry.

As per the estimate, gas as fuel could be consumed in the residential, transport, stationary engines, brick kilins, cement and power sectors.

A trade enquiry has already been floated by ONGC towards preparation of a feasibility report for supply of gas through pipeline to the residential areas of Agartala city. The gas is proposed to be supplied from the GGC at Agartala Dome.

By 1992-93, the number of rigs working in the area are expected to be 12, which are being planned to be converted to run on dual fuel (diesel-natural gas). This idea has been reinforced, more so, due to the fact that the Cummins engines running on dual fuel have indicated satisfactory performance up to 70 per cent replacement of diesel with natural gas.

A five-tonne per day cement plant has been envisaged to be set up after indications of deposits of limestone have been noticed in Tripura. The coal consumption is anticipated to be around four tonnes per day which could be substituted by natural gas.

There exists a strong case for setting up gas based power projects in the state, in order to meet the power shortage. The power sector has been identified as the chief potential user of natural gas. The present rate of gas supply to the TPSED from the Baramura structure is about 70,000 cubic metres per day. Gas supply from Gujalia and Rokhia structures is also to be started soon. Presently, only one 5 MW turbine is operating and the second 5 MW turbine is to be commissioned by Sept., 1987. By March, 1989, the third turbine is also proposed to be commissioned. At Rokhia, orders have been placed for commissioning of 2 × 5 MW turbines. A 75-MW (7.5 MW 10) project, based on gas, is also on the anvil. The total consumption potential of gas for power is expected to be 1.1 million cubic metres of gas.

As far as the utilisation of natural gas as feedstock is concerned, the Union Government is actively examining setting up of a 1000 tpd fertiliser plant.

COAL OUTPUT MAY MISS PLAN TARGET

Coal production in the Seventh Plan is likely to fall short of the target by five to 10 million tonnes due to project slippages, according to a review carried out by the Planning Commission.

The Planning Commission had set a coal production target of 226 million tonnes for 1989-90, the terminal year of the Seventh Plan. However, latest estimates put the production in 1989-90 at 215 to 221 million tonnes provided no further slippages take place.

The review shows that the demand for coal will also be less than what was forecast at the time of finalisation of the Seventh Plan. The original forecast of demand for the terminal year of the Seventh Plan was 236.7 million tonnes. This figure is now put at 220-229 million tonnes due to lower demand from steel sector and lower generation of power by thermal power stations.

It is felt that the gap between the demand and supply of coal can be met by drawing down pithead stocks of coal and by resorting to higher imports of coking coal.

A number of projects have slipped due to delay in supply of equipment by Mining and Allied Machinery Corporation (MAMC), Heavy Engineering Corporation (HEC) and Jessops. Projects have also slipped due to land acquisition stalemates, delays in forest clearance and preparation of environmental plans and power shortages.

The review has also shown that the coal exploration programme will have to be accelerated to avoid compulsions of setting up high-cost projects. The coal exploration target for the Seventh Plan is 2.16 million metres. However, the progress of the programme has not been up to the mark.

The production of lignite by the Neyveli Lignite Corporation (NLC) is also likely to fall short of the Seventh Plan target by 2.5 million tonnes.

The Seventh Plan target for production of lignite by NLC is 13.7 million tonnes. However, due to delay in the coming up of the power units, the production in 1988-89 is expected to be only 11.2 million tonnes.

The Planning Commission has also drawn up tentative production plan to meet the demand for coal through 2004-05. The plan will bridge an estimated gap in coal production of 112 million tonnes at the end of the Eighth Plan and 247 million tonnes in 2004-05.

PSF, PFY UNITS CAN BUY CHIPS FROM MARKET

The government has decided to allow polyester staple fibre and polyester filament yarn units to buy the chip from the market to manufacture the two items. Simultaneously it has allowed polyester condensation units to reach minimum economic size of 15,000 tonnes. A decision has also been taken to allow the existing to expand capacity to the economic size.

The release states that a number of commitees and industry association had been seeking the facility to bring down costs through economics of scale.

OIL to shift office to Duliajan

The Union government has decided shift the headquarters of Oil India . (OIL) from Delhi to Duliajan in sam. This is being done to inten- y oil exploration.

It is learnt that, to start with, the vernment wants the directors of the mpany to move their offices to Du- jan. Sources in New Delhi explain at so far no definite word has been ceived by OIL officers though infor- ally they have been advised to shift. formal directive is expected to be sued by the ministry of petroleum d natural gas soon.

Officials in the petroleum ministry plain that by March 1988 the whole fice would have shifted to Duliajan. n estimated 100 members of staff re in the Delhi office of which over 0 are executives. Many of them have ut in more than 15 years service ith OIL in Delhi.

The move to shift the headquarters om Delhi has placed many of them a quandary. They are in two minds hether to change jobs or to shift as er the directive.

In Delhi the public sector unit is ex- ected to maintain a liaison office with resident manager to hold the fort.

The public sector unit hit the head- nes recently following the controve- sy over the shifting of its chief Ma- r Gen. Jatar to Hydrocarbons Ltd. he Assam government and the AASU ent hammer and tongs after Gen. atar who successfully stalled AASU om disrupting production during the eak of the Assam agitation.

It was only recently that the Assam overnment approached the Centre eeking the replacement of Gen. Jatar om OIL. Incidentally, after his trans- r to Hydrocarbons Ltd., OIL has een running without a chief. The ork is being shared by its senior di- ctors including those looking after nance and exploration.

The company suffered complete oppage of work on five occasions etween November 1986 and March 987 following the students' agitation Duliajan. This led to a shortfall in oduction of 1,63,000 tonnes of cru- e oil and related shortages in drilling ork and lpg production during this period. The loss is estimated at Rs. 15.50 crores.

This is apart from the loss to the Centre and the state government by way of cess, royalty and sales tax.

Public sector oil industry executives have expressed concern at the Government's move.

The executives say that the Government's move, in response to the demand of the Assam Government and the local students union, is "hasty and shortsighted."

The shifting of the headquarters of this Central undertaking to Assam is fraught with "grave consequences and will set a bad precedent," according to Oil India executives.

They expressed resentment at the Government's move, particularly when more than 340 company executives have resigned or sought transfers from Assam in the past two years following the students agitation and hostility from some sections of the local people against non-Assamese personnel.

The Petroleum Minister had informed the last session of Parliament that during 1986-87 and 1987-88 (up to June), 42 Oil India executives had resigned and about 300 had sought transfers by way of postings elsewhere and deputations.

The "agitational atmosphere" prevailing in Oil India's area of operation was among the reasons cited by the minister for the large-scale resignations and requests for transfers from Assam.

Oil India executives point out that shifting the company's headquarters from Delhi to Duliajan may lead to further resignations, particularly of experienced non-Assamese personnel.

Oil India's corporate headquarters has been in Delhi since the inception of the company for the past 28 years. The period includes its functioning as a British company, a joint sector company and then a public sector undertaking.

The company's Chairman and Managing Director and the directors of finance, personnel and exploration have been based in Delhi. The company's Operations' Director has been functioning from the field headquarters in Duliajan.

Some of the executives now functioning from Delhi have come to New Delhi on transfer from Assam in the wake of the students agitation and assaults by anti-social elements. They say they would rather resign than go to Assam when the headquarters of the company is shifted there.

The Petroleum Ministry is reported to have decided to shift the headquarters to Duliajan to "improve the company's oil production."

However, Oil India executives point out that the company's oil production recorded a marginal shortfall in the past two years mainly because of work stoppages following the students' agitation and the ageing of the oil wells.

The company lost 163,000 tonnes of crude oil and suffered stoppages in LPG production during 1986-87. The loss is estimated at Rs. 15.50 crores.

Despite the shortfall in production, the company earned a net profit of Rs. 50.60 crores during 1986-87.

Oil India executives point out that the company's fields produced more than three million tonnes of oil a year in the 1960s and 1970s. They say shifting the company headquarters will not in any way help improve production but would lead to further demoralisation among the executives.

Further, it would lead to Oil India becoming a regional and State enterprise in the event of a large number of non-Assamese executives resigning. More over, it would restrict the company's operations in Rajasthan, the Mahanadi Basin off Orissa and in the Andamans.

The company has in recent years invested several crores in buying nearly 50 flats in Noida, UP, and south Delhi for its senior executives.

Oil India sources say the company, based in Delhi, was able to control its nation-wide operations and maintain liaison with the Petroleum Ministry and other organisations.

Citing the example of the Oil and Natural Gas Commission, the sources point out that although 80 per cent of its total oil production came from Bombay, ONGC was operating from its headquarters in Dehra Dun and corporate office in Delhi, far from the oilfields.

Coal compendium released

The Minister for Energy, Mr. Vasant Sathe, released 'coal compendium' brought out by the World Science News, a weekly publication.

The coal compendium seeks to discuss and deal with the various facets of the coal industry. These include the long-term coal and power perspective plans, new technologies in the coal sector, research and development, new thrust areas, ecological and environmental technologies, upgradation in coal mining industry and beneficiation technologies. A special chapter deals with fluidized bed combustion technology.

The coal compendium seeks to give information to its readers about the importance of the coal industry in the day-to-day life of every individual wherever he is. The purpose of publishing the compendium is to inform its readers about the state of art in the technological development of the coal industry in India as well as the technologies available else-where in the world.

As new technologies are becoming available in the coal sector, it is necessary to keep pace with them. The coal compendium has highlighted various technologies available in other countries for various types of mines including thick and thin seams. It has also dealt with various advances in the area of electronification which can be gainfully employed in the coal sector. The Coal India's satellite communication and computerisation programme has also been dealt with.

There are chapters on equipment development and import substitution, opencast mining technologies and equipment, improved techniques for coal storage and preparation, quality control in mines. Special coverage has been given to manpower development-education and training, transportation of coal including coal handling systems for coastal thermal power stations. Special stress has been laid on ecological and environmental technology, environmental control and reclamation

Quoting the various studies undertaken by various agencies and organisations in the recent past the compendium says that coal production will have to be increased manifold to meet the requirements of infrastructure industries like power, steel, cement and railways. It is estimated that by the year 2000 the country would need to create an additional capacity of 1,10,000 mw. Of this 48,000 mw will be in the Eighth Plan and 62,000 mw in the period 1995-2000.

In the power sector, the major contribution will come from coal based thermal power stations.

SEMINAR ON "HIGH PERFORMANCE SURFACE COATING INKS FOR PLASTICS" SATURDAY 16TH JANUARY, 1988

The Colour Society is planning a full day seminar on "High performance surface coatings and printing inks for plastics" on Saturday the 16th January, 1988 at Taj Mahal Hotel, Apollo Bunder, Bombay 400 039.

The Seminar will include invited lectures by eminent Scientists and Technologists and also presentation of original/review papers. Following topics are being covered. 1. Coatings for industrial structures, 2. Tank and pipe coatings, 3. Heat resistant paints 4. Coatings for silos/flooring and effluent tanks, 5. Surface preparation for high performance coatings, 6. Flexographic and gravure inks for plastics, 7. Plastic substrates for printing.

Original/review papers on the topics to be covered are invited for presentation at the seminar. Persons intendin to present papers are requested t send extended abstracts of about 400 words in duplicate by 15th November 1987. Abstracts shall be accepted fo presentation after scrutiny, dependin on time available and the relevanc of subject on the theme of the seminar. Full text of papers can b submitted by 15th December, 198 for publication in the Journal of Colour Society.

Registration of Delegates :

The registration charge for delega es attending seminar will be Rs. 125 per delegate for members already o the Colour Society and Rs. 200/- p delegate for non-members.

More details can be had from Th Colour Society (C/o. Dr. A. V. Pr dhan, PPV Section, University Dep of Chemical Technology N. M. Pare Marg, Matunga, Bombay-400 019).

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amrup-III PDIL's turnkey goes on stream

The Namrup-III Fertilizer Plant ned by the Hindustan Fertilizer Cor- ration Ltd., located in upper Assam the District of Dibrugarh has gone o production. This was a turn-key oject assigned to the Projects & velopment India Ltd., a premier de- gn engineering and consultancy or- nisation in India. The plant will pro- ice 600 MTPD of ammonia and 67 MTPD of urea based on natu- l gas as the main raw material. The ants have achieved their full rated pacity production.

The scope of work entrusted to PDIL cluded design, engineering, procure- ent, inspection, follow-up, supply ansportation, receipt and issue of aterials to contractors, supervision f construction, erection, commissio- ing and gurantee test, for ammonia nd urea plants and 17 off-site plants ke steam generation, auxiliary boiler, aptive power, water treatment, etc. other words, PDIL's liability cover- d the entire spectrum of a large ferti- zer project.

The process scheme for the manu- cture of ammonia in Namrup-III is milar to that of a typical natural as-based single stream plant i.e. na- ural gas desulphurisation, steam cata- tic reformation followed by secon- ary reformation with requisite air, aste heat recovery system to extract aximum heat from process gas and tgoing flue gas, high and low tem- erature CO-shift conversion and maxi- um heat utilisation for subsequent decarbonation by Benfield process, methanation and synthesis.

For the urea plant, PDIL developed the process on its own and prepared the basic engineering documentation adopting a modified total solution recycle route with in-plant heat recovery. This is a 1167 TPD plant with synthesis pressure optimised at 225 ata. The PDIL process has some advantages over other processes, for example, it has less severe operating conditions in the first stage decomposer/stripper and reduced size of synthesis converter.

Another special feature of Namrup-III is that almost all the catalysts charged in the plant (except the ammonia synthesis catalyst) have been manufactured and supplied by PDIL which are running with satisfactory performance.

This was a big challenge to PDIL and PDIL, backed up by highly professional task force and engineering excellence, has proved its worth in building such plants with its own in-house technology. As a matter of fact, PDIL, in Namrup-III fertilizer plant, has achieved a new milestone in pursuit of self reliance in Indian fertilizer industry.

With the commencement of production at the Namrup-III Fertilizer Project, PDIL's expertise and capabilities have been widely acclaimed. PDIL share joys and cheers with HFCL for the achievement of the success.

LUBRIZOL INDIA TO DIVERSIFY

Lubrizol India Limited, a public sector company manufacturing additives, is diversifying into newer areas such as synthetic lubricants and industrial speciality chemicals.

It will procure technologies from its collaborators, Lubrizol Corporation of America, for new products besides simultaneously working on the development of technologies in diversified areas.

According to Mr. P. K. Rudra, chairman and managing director, Lubrizol India would offer in the next couple of years a large number of new additives and update almost the entire range of its additive systems.

The company is shortly going to set up facilities for the manufacture of higher performance dispersants, high TBN phenates, magnesium sulphonates and extreme pressure additives. These additives will be made for the first time outside the Western countries, it is claimed.

Meanwhile, the company has fared better during 1986-87 with sales increasing to Rs. 126 crores from Rs. 113 crores in the previous year. Its pre-tax profit has increased to Rs. 7.52 crores from Rs. 5.74 crores. Equity dividend has been stepped up to 2.25 per cent from 21 per cent.

The improvement in the profits has been despite the maintenance of selling prices of the products. The company has not made any upward revision of prices since June 1, 1985, and has been able to exceed the targeted profits during the last two years.

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Draft Indian standards

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO DRY-CLEANING

Bureau of Indian Standards has prepared a draft Indian Standard method for determination of colour fastness of textile materials to dry-cleaning (**first revision** of IS : 4802-1968), Doc : TDC 5 (2440), which prescribes a method for determination of colour fastness of textile materials of all kinds and in all forms to dry-cleaning. This standard has been revised to align it with international standard on this subject and also to incorporate changes in line with other national standards on colour fastness tests.

TERMINOLOGY OF JIGGERS

Bureau of Indian Standards has prepared a draft Indian Standard Terminology of jiggers Doc : TDC 45 (2397) C, which gives an illustrated nomenclature of a jigger used for processing or treatment of textile fabric. It also covers principle of fabric batching, general specification, machine features and designation of sides and dimensions of jiggers.

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO HYPOCHLORITE BLEACHING

Bureau of Indian Standards has prepared a draft Indian Standard method for determination of colour fastness of textile materials to hypochlorite bleaching (**first revision** of IS : 762-1956), Doc : TDC 5 (2452), which precribes a method for determination of colour fastness of textile materials of all kinds and in all forms to the action of bleaching baths containing sodium or calcium hypochlorite in concentration normally used in commercial bleaching. This standard has been taken up for revision to align it with the International standard and to incorporate changes in line with other national standards on colour fastness tests.

CODE OF PRACTICE FOR FABRICATION OF POLYMERISERS/CURING MACHINES/BAKING UNITS USED IN TEXTILE PROCESSING

Bureau of Indian Standards has prepared a draft Indian Standard Code of practice for fabrication of polymerisers/curing machines/ used in textile processing Doc : TDC 45 (2261) C, which deals with fabrication of curing machine, its installations, machine features, materials of construction, design data, exhaust, safety provisions, inspection and testing, packing, erection, commissioning and handing over and maintenance and lubrication of curing ranges used in textile processing.

The draft standards will be circulated to interested manufacturers, users and technologists for eliciting comments which will be taken into consideration before finalizing the draft as an Indian Standard.

Copies of the draft standard will be available, free on request, from the office of Bureau of Indian Standards, Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi-110 002.

Mr. K. K. Nair Dead

Mr. M. K. K. Nair, former Chairman and Managing Director of the Fertilizers and Chemicals Travancore Limited (FACT) died at Trivandrum on 26th September. He was 66. He is survived by his wife and three sons.

Mr. Nair, who played a crucial role in the industrialisation of Kerala, as FACT Chairman from 1969 to 1971, was responsible for the growth of the company into the premier public sector undertaking. He also played a significant role in the growth of the Bhilai Steel Plant as its General Manager.

Mr. Nair had served the Planning Commission too.

The Chief Minister, Mr. E. K. Nayanar, in a condolence message, said that Mr. M. K. K. Nair's contributions to the State's industrialisation were unparalled.

R. Bidwatka elected President

The Kalyan Ambarnath Manufacturers Association (KAMA) has elected Mr. Rammohan Bidwatka as its new President at the annual general meeting held at Kalyan recently.

Mr. Bidwatka took over from Mr. D. V. Singh.

Addressing the AGM, he said, during his tenure he will make efforts to make the KAMA "more effective, disciplined and result-oriented" Dialogue will be initiated with various departments of the Government to solve the problems of the industry, he added.

He also assured members that membership enlistment drive would be undertaken and announced the names of 25 members

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Highlights In Chemical Technology (Part 1)

A NEW RANGE OF MICROCELLULAR POLYMER FORMS SEEK NEW INDUSTRIAL APPLICATIONS

A variety of applications are being explored for new microcellular polymer foams developed by Sandia National Laboratories (Albuquerque, N.M.). Sandia scientists have made polystyrene foams with a cell size as small as 0.1 micrometer in diameter, one thousandth the size of conventional polystyrene cells.

The technique for making the new foams is quite general reports company's researcher James H. Aubert. A solution of polymer is made and caused to undergo phase separation. The solvent is removed either by freeze-drying or extraction, leaving behind a microcellular polymer foam. Possible uses include catalyst supports and other applications requiring a large surface area, like absorbable templates for delivering controlled-release drugs. (*Chem. Wk.* 4/29/87 p. 32).

ULTRA-SOUND A NEW CATALYST FOR ORGANIC SYNTHESIS

Ultra sound has been employed by a group of Japanese researchers at Gifu University to prepare 3-aryl glutaronitriles in good yields. The researchers irradiated benzaldehyde, naphthaldehydes and substituted benzaldehydes in the presence of superoxide ion and acetonitrile. Yields ranged from 36 to 81%. (*Chemistry Express*, 2, 169 (1987) (*Chem. & Ind.* 5/18/87 p. 347).

A NEW COMPOSITE MEMBRANE FOR REMOVING ORGANIC SOLVENT FUMES FROM ENCLOSED WORK PLACE

A composite membrane for removing organic solvent fumes from enclosed workplace has been developed at the Fraunhofer Institute of Interface & Bioengineering in West Germany. The membrane based on a polydimethyl siloxane layer applied to a permeable carrier material is said to be 200-times more permeable to solvent gases than to air. (*Chem. & Ind.* 5/18/87 page 347).

DESMOBOND -- A NEW LOW VISCOSITY TWO COMPONENT URETHANE ADHESIVE

Mobay has developed a structural adhesive technology based on a new low-viscosity two-component urethane structural adhesive called Desmobond, for which a patent is pending. The new technology can bond composite automotive panels in about one minute, compared with the three to five minutes that it now takes.

Mobay reports that Desmobond is characterized by excellent bond strength, high fibre-tear resistance and moisture resistance. The bonding technique is said to allow: economical bulk storage and highly automated handling of raw materials; elimination of bond line pretreatment to promote adhesion between the inner and outer panels; use of efficient high-pressure mixing; rapid precision application by robotics and fast energy-efficient curing. In existing composite bonding operations, Desmobond can also be used to reduce cycle times to about two minutes. (*Chem. Wk.* 5/27/87 p. 34).

POLYETHYLENE GLYCOLS FIND USE IN PRESERVATION OF OLD TIMBERS OF SUNKEN SHIPS

Archaelogical researchers in their endeavour to preserve rotten timber of sunken ships salvaged from the deep ocean, have found a new use for polyethylene glycols of various molecular weights ranging from 200 to 4,000. They have found that polyethylene glycols can be effective in preserving ancient rotten timbers.

While many chemicals have been considered for use in ship timber preservation projects, polyethylene glycols (PEGs) have the best track records from recent research. The water-soluble PEG is used to displace water in wood cells, which have been partly degraded by chemical bacterial and fungal attack during years (extending to quite a few centuries) of exposure to sea water. The treatment with PEG keeps the wood from shrinking and cracking. To prevent further attack the timbers are also treated with biocides, usually boron-based preservatives, prior to PEG doses.

The major hurdle to researchers, is that while it is easy to get PEG into degrded cells, it is difficult to get the material into regions of the wood that are relatively round and well preserved. Therefore, two research projects have been planned, one in the UK and the other in West Germany.

The UK project finalized recently,

ill be on the salvaged hull of the udor warship Mary Rose at the oyal Navy base at Portsmouth. A ilot plant has been set up adjacent the salvaged hull of the Mary ose. In this pilot study, scientists uring the next three years will use EG with varying molecular weights try to preserve the ship's timber, hich spend 437, years submerged Portsmouth harbour. The scientsts will experiment with a two-part eatment using PEG with molecular eights of 200 to 4,000. First they ill use low-molecular-weight PEG penetrate the hard core of the ood and stabilise the more intact ell walls. A subsequent treatment ith a higher-molecular-weight PEG, hich has a greater bulking effect, ill flush out and replace the low nolecular-weight material that has settled in the more degraded parts of the wood, such as the cell lumina and large capillaries.

In the German project, a group at he Dentsches, Schiffahrtsmuseum Bremerhaven, West Germany) is sing a similar two-step PEG nethod in the preservation of the remer Kogg, a merchant vessel uilt in 1380 A.D. and recovered iece by piece from the Visa River uring the 1960s. Conservator Per offman, who heads the two year roject, reports that the ship is being eated in a sort of aquarium to ermit public viewing. The structure fitted with PEG 200. In a couple f years a switch to a higher weight EG material will be made.

The above two way approach is ot without some risks. Scientists ave been wary of using low-nolecular weight PEG, because it is ighly hygroscopic -- able to adsorb noisture readily -- which may leave ood tacky after treatment. To mon-or the wood's PEG content, esearchers plan to use high per-ormance liquid chromatography and -ray microanalysis. (*Chem. Wk.* 5/6/87, pp 34-36).

DOW CHEMICAL REPORTS LOW-COST ENERGY SAVING IN MAGNESIUM PRODUCTION

Dow Chemical Company is a pioneer in magnesium production technology from 1939. In recent years the company has reported considerable progress in developing energy-efficiency in its magnesium production technology. Its chemical engineers have achieved in the company's Freeport magnesium operations a saving by 42% during the past 10 years since 1977.

In recent years Dow engineers have successfully worked on refining the electrolysis stage with a computer system to follow current demand closely for greater efficiency. The cell currents are over 175,000 amperes, so monitoring them is very significant for process improvement with reference to optimization of energy consumption. Computer control, achieved so far, is estimated to have saved 2.5% of power costs already. In addition statistical quality control applied throughout the electrolysis section of the plant is figured to have saved 6% of energy use. Dow has also reported considerable savings in the plant's natural gas consumption by improving the design of the gas-fired refractory chamber and anodes.

The above advance in magnesium production technology has placed Dow in the vanguard in magnesium production. (*Chem. Wk.* 5/20/87 p. 37).

MANY INNOVATIONS IN PLASTIC PACKAGING FROM AMERICAN COMPANIES

America has been a pioneer and a world leader in plastic packaging in the last 3 decades. The innovations in plastic packaging is still growing at a fast tempo in the USA and Dow Chemical Company is in the vanguard in this field. The sale of plastic packaging material amounted to over $3 billion/year in 1986. A recent seminar organised by the Society of Packaging Professionals (USA)in last May highlighted innovations in plastic packaging by Dow Chemical and other companies.

At the seminar Dow unveiled a new modified EVA adhesive. This adhesive in the four-layer barrier lamination film doubles its bond to high-impact polystyrene cups, to solve the problem of the lid stock bonding better to the film than the film does to the cup. That problem can cause the barrier film to separate from the cup when the product lid is opened. The four layer film includes PVDC, high-density polyethylene, a tie-layer of EVA and the modified EVA adhesive. The product has an improved temperature seal range over other PVDC barrier films and improves barrier protection, since it can be bonded to the inside of the food cup.

Another Dow's innovation unveiled was a PVDC disposable liner made for heavy vinyl bags used inside shipping containers to transport bulk liquids such as fruit juices. The product also has potential for use with bulk chemical shipments because of its high chemical resistance.

Several companies at the exhibition on the occasion of the seminar, featured applications of the packaging materials for the electronics industry. Arco Chemical (Phila. Pa) and its Japanese joint venture partner, Japanese Styrene Paper (JSP) exhibited the use of their Arpro moldable polypropylene beads as protective foam packaging for Hewlett Packard computers. The product, which resists heat, absorbs

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energy and provides multiple impact cushioning. The product also can be profitably used in automobile pumpers.

Dow also exhibited a new product for disposable protective gear in the nuclear industry, using a co-extruded PVDC film as a tritium barrier in workers' clothing. The 9-mil product is reported to provide much higher protection from tritiated (radioactive) water, than the 12-mil. polyvinyl chloride (PVC) tritium barrier suits already in the market. Tests conducted by Radian Corp. (Austin, Texas) show that the co-extruded PVDC film suits will protect workers 'four-times better' than the PVC film suits. (*Chem. Wk.* 5/20/87 pp 17-20).

A COMMERCIAL PROCESS FOR PRODUCTION OF MAGNETOSTRICTIVE ALLOY DEVELOPED IN SWEDEN

A commercial process for producing rods of a new magnetostrictive alloy has been developed by a research team from Uppsala University in Sweden. While the alloy has been to scientists since last 20 years, it has only been produced in small quantities on a laboratory scale mainly for military purposes. The new process opens up vast possibilities in high-tech research and development.

The alloy consists of iron and number of rare metals, including terbium, samarium, holmium and dysprosium. The new process provides for the alloy to expand in a controlled manner under the influence of a magnetic field very rapidly. A 10cm long rod can thus be made to grow 0.2 mm in 50 microseconds. This magnetostrictive effect is capable of producing a rapid mechanical response, large forces, high acoustic power densities and high electrical mechanical energy conversion efficiency, allied to low mechanical hysteresis, according to a recent article published in new *Swedish Technology*, a journal published by the Swedish National Board for Technical Development.

Among possible applications for the new alloy are robot control, valves, fuel-injection systems, fluid-control, printing, micro-positioning, as well as actuators, transducers and acoustic devices.

The new product will be made available commercially by Feredyn AB, Uppsala, a company formed by the inventors of the process. (*Swedish Trade News* 7/1987, p. 6).

MAN-MADE CATALYST MIMICS PHOTOSYNTHESIS

Researcher Michael Gratzel and his colleagues at the Federal Polytechnic in Lsusanne, Switzerland have developed a catalyst, which like plants can turn carbon dioxide into a useful material. Plants take low-energy carbon dioxide and with the aid of sunlight and water make high energy carbohydrates. The Swiss scientists by this metallic catalyst have found a way to convert carbon dioxide to methane at room temperature. Methane, so produced could be a useful fuel and a source of chemicals.

The novel catalyst is composed of ruthenium oxide spread finely on titanium oxide powder. Michael Gratzel has worked for more than a decade on catalysts that split water (in presence of sunlight) into hydrogen and oxygen. Other scientists were sceptical about Gratzel's experiments.

In the reaction of carbon dioxide and hydrogen, the Sabatier reaction, the carbon dioxide sways two oxygen atoms for four of hydrogen. With his new catalyst, Gratzel has managed to carry out the Sabatier reaction efficiently at room temperature for the first time (*Nature,* Vol 327, p. 506). The mechanism of th reaction is uncertain, but it seems t start with titanium dioxide, which i a semi-conductor, absorbing near UV light. This excites electrons from the valence band into its conductio band. These conduction band electrons are picked up by the rutheniu and convert the carbon dioxide int carbon bound to ruthenium and tw oxide anions.

Meanwhile, the holes left in the titanium dioxide's valence bond oxidise the hydrogen molecules t hydrogen ions, which combine wit the oxide irons to form water. Hydrogen molecules also react directly with the ruthenium-bound carbon to produce methane.

Gratzel and his team of researchers are excited by the possibilities o this 'Carbon-fixing reaction'. It could help solve the green-house problem... We could in future keep it at a constant level by collecting waste CO_2 for conversion to methane. New catalysts that are under development will permit researchers to use light to convert methane to other industrially useful chemicals. (*New Sc.* 7/23/87 p. 27).

THE WORLD'S FIRST HIGH-TECH RUBBER TYRE RECYCLING FACILITY MAKES A DEBUT IN THE USA

Last March saw the inauguration of the world's first latest high-tech rubber tyre recycling facility at Babbitt, Minnesota (USA). This modern facility is based on a rubber recycling process called Tyrecycle by its developer Rubber Research Elastomerics Inc. of Minneapolis. Key to the process is a proprietary polymer that when applied to ground scrap rubber renews the rubber by facilitating the cross-linking of vulcanized or cured scrap to itself or to an uncured ber matrix. The result is a bulk der or sheet stock product that be used in rubber and plastic nufacturing processes much like virgin rubber. Typically, the npany reports, 50 to 75% of the ecycle' compound could be rporated into a final product out materially affecting its phys- properties. The Minnesota facil- with a capacity of 60 million lbs. year of compound, is owned by Louis County and will be oper- d on a 13 year lease/buy back is by Rubber Research Elasto- ics' tyre cycle division. (*C & EN* 0/87 p. 16).

ROJECT FOR BULK ODUCTION OF PORCINE MATOTROPIN PLANNED BY TERNATIONAL MINERAL & EMICAL (USA)

nternational Minerals & Chemical SA) plans to spend $50 million r the next several years to build production facilities for porcine somatotropin, a biosynthetic protein that improves lean weight and rate of weight gain for market hogs. The company has not revealed specific details of the production project, but it has set a target date of Spring 1989 for completion. It expects to receive all necessary FDA approvals. (*C & EN* 3/30/87 p. 6)

AN IMPROVED PROTOTYPE WET ELECTROSTATIC PRECIPITATOR PROVES ECONOMICAL

Success with a prototype wet electrostatic precipitator that removes fine particles from industrial flue gases is leading Sonic Development (Parsipanny, N.J.) to believe that the unit could have much broader application.

A key element of its design is a patented electrode geometry that allows a higher field strength for greater collection efficiency in less space. At a water-treatment plant having compliance problems with particulates -- most of which were less than 1 microne -- in its greases incinerator, the retrofitted unit did the job at 140% of the capital cost and half the operating cost of other systems' reports Wayne Hasrtshorn, president of Sonic Development. (*Chem. Wt.* 7/29/87 p. 17).

NEW ADDITION -- POLYETHER KETONE

A polyether ketone has now been included among the range of special plastics available from BASF. It will be markted under the name 'Ultrapek'. According to BASF this is a partly crystalline thermoplast with a permanent temperature resistance of up to 250°C and even as high as 300°C in its reinforced version. The polyether ketone can be processed by a wide variety of methods.

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dustrial alcohol : need for policy change

ASHOK M. KADAKIA

ODUCTION

ior to World War II, the use of alcohol was confined to ble use. The drug and pharmaceutical industry had to rt alcohol. On the grant of protection to sugar industries g the year 1932 a number of sugar factories were devel- d in the states of U.P. and Bihar. But molasses had to be osed off as waste or burnt and one had to pay for its oval. It was in the year 1938, the first National Govern- t in the States of U.P. and Bihar apoointed a joint com- ee to study the problems facing the sugar industry and for establishment of distilleries to manufacture alcohol from asses and it was further recommended that alcohol could used as "motor fuel" with the admixture of gasolene. Thus er alcohol industries grew up in U.P.

was only during 1955, that the Government of India ointed a Committee under the Chairmanship of Dr. Nag- ja Rao to go into the various aspects of increasing the pro- ction of alcohol produced from molasses and for suggesting measures to be undertaken for its growth and develop- nt. Since then a number of chemical industries based on ohol sprung up in the country.

rly Growth

r. Nagaraja Rao Committee had recommended among er things the basic price for molasses and alcohol taking account the cost of production, transport charges on lasses from sugar units to distilleries and also the tax struc- e to be devised between the Central and State Government.

he position of alcohol producing industry from the begin- g of the 2nd Plan period i.e. 1956 to 1976-77 is given in ble-1.

Dr. Bimal Jalan Committee

In the year 1976, keeping in view the recommendations of the Nagaraja Rao Committee's findings, the Government of India appointed another Committee under the Chairmanship of Dr. Bimal Jalan, whose recommendations are still referred to by the industrial users of alcohol. The recommendations of Dr. Bimal Jalan are farsighted and have given the necessary impetus for the Central Government and the State Governments to follow. Its recommendations are:

On Molasses: There should be uniform levies for usage within the states and interstate movement on molasses should be given up.

On Alcohol: The present structure of state levies should be reconstructed and they should be of a uniform level in all the states. There should be free movement of industrial alcohol and interstate levies should also be in line for consumption within the State as deficit states are faced with the disadvantages of transport. Deficit states importing alcohol from surplus states should do away with entry tax or counterveiling levies.

"The Committee emphasised the need for a realistic and viable pricing policy for molasses and alcohol which would provide a reasonable price to the manufacturers at the same time safeguarding the interests of the industrial consumer, ensuring fuller utilisation of capacity and smooth movement of alcohol and molasses within the country".

Development of the Industry:

Swaminathan Committee set up by the Government of India in 1977 had made an indepth study of the alcohol based chemical industries and suggested quite a number of recommendations for the development of chemicals based on alcohol as the feedstock.

The important and noteworthy features of Swaminathan Committee Report are briefly as under:

a) Alcohol should preferably be used as a chemical feed stock and not as fuel.
b) To ensure an annual growth rate of 10% and initiate Research and Development.
c) To increase the output of alcohol from about 215-220 litres per tonne of molasses to about 250-260 litres.
d) The price of alcohol to alcohol based chemical industries be kept at a low level at about Re.1 per litre.
e) Acetaldehyde as the basic building block and its deriva tives viz. acetic acid, its solvents and esters, butanol, 2-ethyl hexanol, acetone etc.

The Swaminathan Committee further recommended that technical efficiencies of the distilleries must be improved and make maximum alcohol available from the present availability of molasses.

ABOUT THE AUTHOR

i Ashok M. Kadakia, the eldest son of Shri Manilal H. Kadakia, k his B.Com. degree from Bombay University. Even in his col- e days, he took keen interest in the family business. It was enthusiasm which started Ashok Brothers, a partnership firm r developed into a large scale marketing firm, especially of id organic chemicals, acids and solvents.

er, he became Managing Director of Ashok Organic Industries ited. He is also a Director of Ashok Cellulose Ltd. He is very ively associated in industrial affairs through the Indian Chem- Manufacturers' Association as the Chairman of B.R.C. He is Vice-President of All India Manufacturers' Organisation, harashtra State Board and Executive Committee, Member of India Alcohol Based Industries Development Association as o of Indo Brazilian Society. He has travelled widely through- Europe, United States of America, Canada and Brazil and ost the entire Indian Sub-Continent.

TABLE-1
GROWTH OF ALCOHOL PRODUCING INDUSTRY

Period	Sugar Production in lakh tons	Molasses production in lakh tonnes	No. of Distilleries	Alcohol capacity (in lakh litres)	Alcohol production (in lakh litres)
1956	18.92	7.50	43	1220.00	652.50
1960-61	30.28	12.40	53	1800.00	918.00
1965-66	35.32	15.19	62	2372.00	1805.00
1971-72	38.72	16.96	80	4780.00	2600.00
1975-76	42.62	18.00	119	6100.00	4086.00
1976-77	48.00	20.00	119	6100.00	4380.00
Estimated 1984	70.00	30.00	130	7000.00	6000.00

Technical cells for adopting modern technology in distilleries and the industry should be made available indigenously. Preference should be given for the manufacture of chemicals where acetaldehyde is the building block. However, the ethylene based industry should also be allowed to grow up. In remote areas where petro ethylene is not available, alcohol based ethylene units may be permitted.

The use of molasses based alcohol should be restricted for potable purposes in order to make it available for industrial use.

Research and Development in the fields of fermentation and distillation technology must be developed.

Detailed economic evaluation of the various effluent treatment methods by a competent engineering firm is suggested. The fixed and variable costs of effluent treatment should be taken into account while fixing the revised prices of alcohol.

The suggested perspective plan for the production of alcohol based chemicals over the next ten year period calls for an increase in alcohol production from the present level to 900 million litres by 1985-86 and 1400 million litres by 1990-91. This can be achieved only by drawing out a time-bound national alcohol programme laying down long-term policies, priorities and incentives needed to execute it.

Recommendations of Dr. Bhattacharya Committee 1980

1. Sugar factories and distilleries should be compelled to provide adequate pucca covered storages for molasses, atleast to store four months production at the sugar factory end and to hold four months consumption at the distillery end.
2. To increase the production of Alcohol. It is essential to take the following steps:
   a) Alcohol industry should be given a priority status.
   b) Control price of alcohol should be revised and built-in escalation should be provided in the price formula to keep it remunerative.
   c) Investment and other fiscal incentives should be given for the distillaries to enable add new equipment and machinery and to permit induction of new technology to improve efficiency of production. In case the new technology has to be imported, it should be done on a centralised basis.
   d) Khandsari molasses should also be diverted in all state for alcohol production to augment the total availability c molasses for meeting increasing needs of alcohol.
3. Alcohol should preferentially be used for making hig value added chemical products and its use as an autc tive fuel should not be considered.
4. Raw materials other than molasses being more expensiv for production of alcohol should be considered only adequate quantity of molasses are not available.
5. Some of the early entrepreneurs who ventured on th alcohol-based chemical industries are:

A.C.C.I., West Bengal, (now I.E.L. Ltd.),
Union Carbide, Maharashtra,
Indian Organic Chemicals Ltd., Maharashtra,
Polychem Ltd., Maharashtra,
Synthetics & Chemicals Ltd., Uttar Pradesh,
Sirsilk Ltd., Andhra Pradesh,
Andhra Sugar Ltd., Andhra Pradesh,
Hindustan Polymers Ltd., Andhra Pradesh.

Other large scale plants were also established. M/s. Chemicals & Plastics India Ltd., M/s. Trichy Distilleries and Chemicals Ltd. in Tamil Nadu and Ashok Organic Industries Ltd Cellulose Products of India Ltd., Gujchem Distillers India Ltd in Gujarat, Hindustan Organic Chemicals Ltd., Somaiya Orga ics India Ltd., Uttar Pradesh and a number of drugs and pha maceutical units like I.D.P.L., Hindustan Antibiotics etc. wer Government Undertaking, established in later years.

ALCOHOL Vs PETROLEUM FEEDSTOCK:

It was during the 70's that the petrochemical industry thre a challenge to the steady progress of the alcohol based chemical industry. The development of technology for manufactur of chemicals from crude naphtha and natural gas accelerate thereby curbing the progress of the alcohol based industry

A clear policy statement by Government on petrochemical as feedstock for the organic chemical industry was neede to strike a mean between the petro-feedstocks and the alcohol feedstock. With the Indian Petrochemical Corporatio Baroda and the Bombay High, various organic chemicals an polymer industries were established.

ri D.M. Trivedi, an authority on chemical industry in one apers writes:

Alcohol, as a feedstock, will be accorded a status atleast equal to other basic raw materials and to petro feed stocks and not treated atrictly as revenue sources

a central regulatory and monitoring agency is established with overall authority for production and distribution of molasses and alcohol and also for overseeing an economic and stable price on a long term basis.

because of seasonal nature of the sugar industry a reasonable inventory of alcohol beyond annual requirements of industries is always maintained in the country supervised by the central monitoring authority.

strict implementation of prohibition policies all over the country, providing further that sugar molasses alcohol will be reserved on priority for industrial use.

reserving alcohol based product through licensing regulations with reference to petrobased product-mix.

herefore the problem of the alcohol based industries vis- s petrobased chemical industry has been in the minds of d-setters long before.

owever, it must be recognised that Government has all g been appreciative of the situation and has been show- onsiderable encouragement to the alcohol based industry.

e eighties started with high hopes of progress in the chem- industry. Despite several handicaps faced by the indus- the overall availability of molasses and alcohol was ortable and satisfactory.

e years 1981 and 1982 may be called prosperous years he sugar industry. Sugar production reached a figure of kh tonnes in 1981 and 81 lakh tonnes in 1982. India was to export alcohol during this period.

RKING GROUPS

uring the end of 1982 the Ministry of Chemicals and Fer- rs constituted three working groups:

orking Group on Levies on Molasses and Alcohol,
storage of molasses,
d on capacity utilisation of alcohol based industries.

ese working groups submitted their reports in 1983. The mmendations of these Working Groups were in line with e of the earlier Committees.

owever, during the latter half of 1983 and also during -85 the vagories of nature had its effect on the sugar cane and production of sugar dropped down to unimaginably evels of 59 to 61 lakh tonnes thereby creating acute short- of molasses and alcohol. Many distilleries had to close n. Major alcohol based units found it difficult to work even 0% capacity and some of them had to close down.

here was no other alternative but to import alcohol from seas as some states were giving priority in the allocation cohol to the potable sector. Tamil Nadu and Andhra could not spare even minimum requirements for the alcohol based industry. India imported about 250 lakh litres of alcohol which was just enough to keep the units working to about 45 to 50% capacity till the end of 1985.

During 1984-85 some major units like Synthetics & Chemicals, in U.P. and Chemplast in Tamil Nadu were compelled to import their requirements of feedstock of butadiene for their SBR plant and petrobased ethylene dichloride for their PVC plant respectively. IEL Ltd., Rishra, had to close down their units for major repairs and maintenance. M/s. Sirsilk Ltd., Andhra, has not been doing well for want of alcohol allotment by the State Government. Union Carbide in Maharashtra had its problems, as Government did not allow their plant to work on account of environmental and pollution hazards.

Representations to the Central Government did not have the desired response, as State Governments were keen on increasing their revenues and the acute shortage of alcohol could not meet the demands of both industrial and potable uses.

The beginning of the year 1986 showed a slight improvement in the availability of alcohol for industrial use. However, the Indian Sugar Mills Association has been demanding a total or atleast partial decontrol of molasses and a hike in its price. This however did not materialise.

Scarcity amidst plenty

The alcohol year 1986-87 may be called a peak period. Sugar production reached a mark of 86 lakh tonnes. Even before the season closed many states were flooded with alcohol and they were finding it difficult to store them. U.P. was flooded with alcohol and could not find avenues for its disposal as I.E.L. the largest consumers, had to close down their plant. The steep increase in the export pass fee of Rs.2/litre was not cnsidered viable for the other states to import alcohol from U.P. Similarly, Maharashtra had also hiked the export pass fee. So there was scarcity amidst plenty.

The Central Government could not do anything to prevail upon the State Governments to lower their levies on alcohol for inter-state movement. In May 1986 the Government appointed a sub-committee with Mr. A.K. Das, Industrial Adviser, D.G.T.D. as convenor to study the situation prevailing in the alcohol-based chemical industries on behalf of the National Council for development of chemical industries. This committee submitted its report in October, 1986 covering all aspects of the alcohol based industry, viz. allocation and distribution, fiscal problems such as levies etc., augmentation of alcohol production, modernisation and upgradation of technologies, pollution control measures, effluent treatment plants etc.

In march 1987, a committee under the Chairmanship of Dr. S. Ganguly, met the members of the industry comprising of members of I.C.M.A., AABIDA and others, to draw a perspective plan for the alcohol based industry and also the petrobased chemicals. The Committee's findings had many loopholes and alcohol based industries have suggested many amendments to this report. The report is yet to be finalised.

In Retrospect

It should however, be recognised that while the Central Government is very keen in giving encouragement to the alcohol based chemical industries by forming a National Development Council and inviting A.I.D.A., I.C.M.A., and AABIDA to participate in its deliberations, nothing tangible has been achieved so far.

The recommendations of the various committees appointed during the last ten years have remained only on paper.

The price of alcohol has not been revised for a number of years by the BICP, after taking into considerations the escalations in the cost of production during the last ten years. Therefore, the distilleries had no other alternative but to keep on increasing the price of alcohol in violation of the ETHYL ALCOHOL Price Control Order -- which has become outdated.

Another disheartening feature is the absolute disrespect by many of the State Governments to flout the directives of the Central Government in so far as the allocation and distribution of molasses and alcohol for industrial purposes and also on the levies. This is because of the fact that molasses and alcohol come under the purview of the State Governments and they are at liberty to do what they like. **Unless and until there is central control over the allocation, distribution and pricing and also on levies these distortions cannot be ove
come.**

CONCLUSIONS & RECOMMENDATIONS

a) There should be a National Policy on Molasses and alcoh
including Khandsari Molasses. This could be achieved o
by formulating the recommendations of the number
committees set up by the Government of India from ti
to time, with a clear cut demarcation between petro-bas
chemicals and alcohol-based chemicals.

Alcohol should be given the same status as any ot
essential feedstock. Like petro-chemicals, fertilisers, texti
etc.

b) Sugarcnae/molasses/alcohol is a renewable resource a
every effort should be made to harness its output a
conserve it for a rainy day.

c) Instead of allowing exports of alcohol and molasses it wo
be in national interest if value added chemicals are expor

d) Improved technology for augmenting production apart fr
safety equipment, effluent treatment plants, should o
financial assistance for such developments.

e) Incentives for higher output of chemicals and explor
avenues for exports should form part of the National Po

ACKNOWLEDGEMENT

I am thankful to AABIDA for giving the statistical data

CAPACITY UTILISATION OF ALCOHOL-BASED INDUSTRIES

Product	1978			1979		
	Installed capacity	Production M.T.	Capacity Utilisation %	Installed Capacity	Production M.T.	Capaci Utili- sation
Acetic Acid	38,220	25,592	67	40,020	28,800	72
Acetic Anhydride	14,770	9,112	62	14,770	9,500	64
Butyl Acetate	8,730	3,887	44.5	8,730	4,000	46
Ethyl Acetate	6,390	2,951	46.2	6,390	4,900	77
Monochloro Acetic Acid	8,840	4,852	55	8,840	5,100	58
Pentaerythritol	1,800	996	55	1,800	1,080	60
DDT	4,200	4,284	102	4,200	4,800	114
Styrene	33,000	20,061	61	33,000	19,046	58
Polythylene	13,000	11,680	90	13,000	10,224	79
Acetone	3,000	N.A.	--	3,000	N.A.	--
Butanol	8,250	3,826	46	8,250	4,000	49
Butadiene	25,200	8,550	37	25,000	7,868	32
P.V.C.	16,000	13,916	87	18,000	12,100	67

Source: Bhattacharya Committee.

Requirement of Alcohol for Industrial purposes (as per the Perspective Plan drawn by the Bhattacharya Committee):

1985-86 .. .. 775 Million litres
1990-91 .. .. 1163 Million litres.

PERSPECTIVE PLAN FOR ALCOHOL-BASED CHEMICALS

	Estimated demand 1985-86 (Tonnes)	Requirement of alcohol (kl)	Estimated demand 1990-91 (Tonnes)	Requirement of alcohol (kl)
2-Ethyl Hexanol	37,000	122,100	67,000	221,100
Acetic Acid	55,000	77,000	80,000	112,000
VAM	23,000	47,000	34,000	69,700
Acetone	38,000	98,000	36,000	145,600
N. Butanol	11,000	20,900	15,000	28,500
Ethylene Oxide	16,500	36,300	25,000	55,000
Ethylene Glycol (Lower level)	63,000	115,600	80,000	141,600
SBR	56,000	201,600	93,000	306,900
Styrene	62,000	57,000	90,000	82,800
Total Alcohol		775,500		1,163,200

Source: Bhattacharya Committee.

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no improvement in alcohol supply in deficit states

The industrial alcohol scene continues to be murky. The new molasses policy, announced a few days ago, has not resulted in any improvement in the availability of alcohol in the deficit states.

Huge quantities of alcohol continue to remain with the distilleries of the surplus states, such as Uttar Pradesh and Maharashtra, as the inter-state movement of alcohol is virtually blocked because of the stiff export pass fee imposed by these states.

The alcohol-based chemical industry, which has been expecting a major change in the availability of alcohol in the country with the new molasses policy, has to give a much higher price for alcohol now, with the 100 per cent hike in the molasses price.

The bureau of Industrial Costs and Prices is expected to announce a revised price of alcohol on the basis of the new molasses price shortly. Industry sources think that the new alcohol price could be Rs. 2.65 per litre.

The price of alcohol varies from state to state at present as there is no central control on BICP-fixed price. For instance, in U.P. the alcohol price is Rs. 1.80 per litre, in Gujarat and Maharashtra it is Rs. 3 per litre and in Karnataka it is Rs. 5 per litre.

Industry sources think an upward revision of the alcohol price now would only lead to worsening of the current situation. As it is, distilleries in U.P. are unable to sell all the alcohol to the chemical units in the state at a price of Rs. 1.80 per litre.

Most of the distilleries in the state are already closed as their tanks are all full with alcohol. Nearly 1000 lakh litres of alcohol are stated to be surplus in this state alone.

The surplus in U.P. is mainly because of the stoppage of lifting of alcohol by Synthetics & Chemicals Ltd., the largest user of alcohol in that state. This company alone used to lift 800 lakh litres of alcohol annually, out of a total production of 2,600 lakh litres in the state.

In Maharashtra, alcohol surplus is mainly on account of the closure of Union Carbide, another large user of alcohol. The situation in Maharashtra is likely to worsen in the coming months with a substantial increase in sugar production during this year.

On the other hand, the chemical industry in states like Tamil Nadu, Andhra Pradesh, Karnataka, West Bengal, Kerala, etc. are working below 50 per cent of the capacity because of the non-availability of alcohol.

The chemical units in these states cannot buy alcohol from the surplus states because of multiplicity of levies and taxes existing there. For instance, the export pass fee on industrial alcohol in U.P. is Rs. 2 per litre for chemical sector and it is as high as Rs. 10 per litre for the potable sector.

Industry sources are of the view that this high rate of export pass fee and other levies make it virtually impossible for the chemical units in other states to buy alcohol from U.P.

They say that if the state governments are not agreeable to end the export pass fee on this vital material, there are only two options left for the Union Government. First, to remove industrial alcohol from the purview of state list and put it under the exclusive jurisdiction of the Centre. This would bring an end to the sharp differences in the prices of alcohol in different states.

The second alternative could be to allow duty-free import of alcohol by the chemical industry. In fact, the government has stopped duty free import of alcohol for the time being.

The chemical industry is, however, strongly in favour of the first option as molasses and alcohol are considered a national asset and a streamlining of its distribution could save precious foreign exchange.

The sub-committee on alcohol and alcohol-based chemical industry, appointed by the development council for the chemical industry in its report, has also suggested that for meeting the growing requirements of alcohol, both from alcohol-based industries and the potable sector, the entire molasses must be made available to distilleries for conversion into alcohol. The committee is also of the view that there should be a ban on the export of this raw material from the country.

In order to take care of the temporary surpluses of molasses it should be ensured that the sugar industry build adequate storage capacities. The sub-committee has also felt that it is essential to maintain the cost effectiveness of alcohol as an industrial feed-stock and it may be affected seriously if an attempt is made to decontrol molasses or to substantially increase the price.

(P.A. Francis in *Economic Times)*

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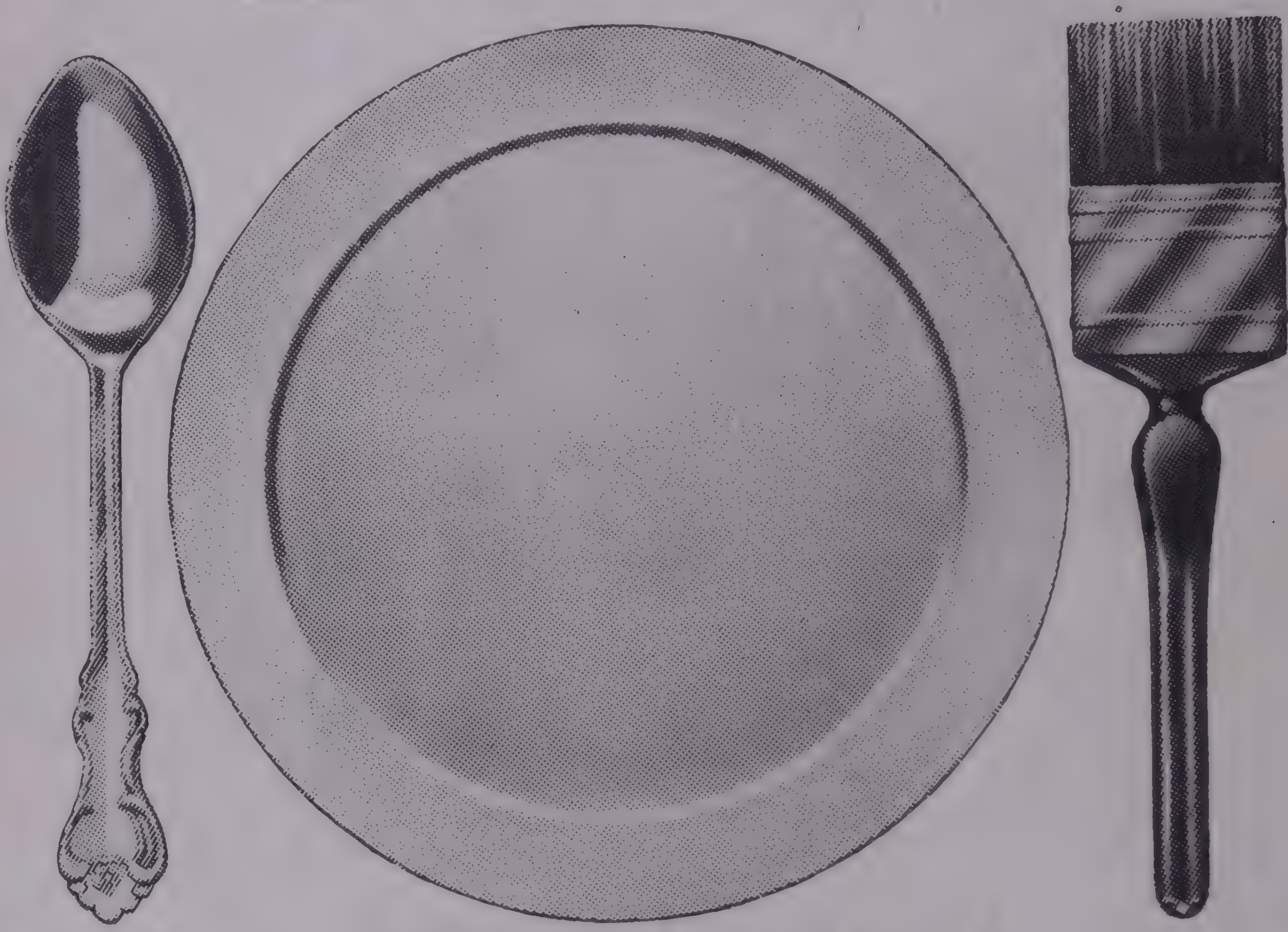

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Chemical News from Abroad

KUWAIT REVEALS PLAN FOR SPANISH FERTILIZERS MERGER

A new plan has emerged which looks set to facilitate the long-delayed merger of fertilizer operations belonging to Spain's ERT and Cros. The Kuwaiti-backed plan also envisages a major reshuffle of the Spanish chemicals sector under which Cros would become a majority shareholder in ERT giving Spain two private sector companies that rank in the European big league in chemicals and fertilizers. Combined sales of ERT and Cros will be over Pta300bn ($2.4bn) in 1987, and the new fertilizer ventures is expected to have turnover of Pta100bn.

Details of the plan emerged after it was revealed that Torras Hostench, a Spanish papermaker 37 per cent owned by the Kuwait Investment Office (KIO), had acquired a 15 per cent stake in Cros. In July, KIO acquired 47 per cent of ERT via direct and indirect share purchases.

Now Kuwait is intending to pass its controlling stake in ERT to Cros while retaining and increasing its position as the biggest and controlling shareholder of the Barcelona chemicals and fertilizers business. Ultimately, it is likely that the KIO will exercise its influence over the two chemical companies by consolidating Cros — and thus ERT — nto Torras Hostench.

The key to the reshuffling plan is a new capital raising share issue for Cros which will be fully backed by Torras. The face value of the new issue will be Pta8.5bn ($70m) but as it carries a 600 per cent premium it will actually raise Pta51bn. This scheme will be put to the Cros board on September 23.

Having raised the money, Cros will then be able to pay all its debts (estimated at Pta30bn on June 30, 1987) and give ERT Pta9bn. This latter payment is the difference in value between the assets which ERT and Cros intend to place into their merged fertilizer business, Fosforico Espanol (Fesa).

Cros will then be able to take a 50 per cent stake in Fesa as an equal partner with ERT. Until now this long-planned merger has failed to come to fruition either because the two companies failed to agree financial details or, more recently, because the Spanish government refused to sanction a merger in which ERT would be the major shareholder.

Sources in Madrid suggest that the new deal regarding Fesa will almost certainly get the backing of the Spanish industry ministry.

For the government, the deal offers the opportunity to complete the national plan for restructuring the fertilizer industry which it began in 1984-85. It also means that Fesa will at last receive the government subsidies set aside to fund rationalization and investment. These have been withheld while ERT and Cros failed to agree their merger deal.

In tandem with its plans for the fertilizer industry, the KIO also wishes to make a major impact in the chemicals sector. Remaining cash after Cros has paid its debts will be used to fund new investments. According to sources, a development plan is already being drawn up in which Cros will lead a big chemical group which includes both its own and ERT's operations.

There are no plans to actually merge the two companies at present, but Torras officials have said that Cros' managers will make the major decisions about both businesses. The key figures in any new group will be Francisco Godia Sales and Juan Antonio Delgado, currently the president and general manager of Cros respectively.

Recently, sources in Madrid suggested that the chairman of ERT, Jose Maria Escondrillas would be forced to resign as a result of the deal between the KIO and Cros. But he is also trying to persuade the industry ministry to block the KIO plans.

For its part, the KIO has let it be known that it would seek buyers for ERT's explosives business — which accounted for 5 per cent of the group's Pta224bn sales in 1986 — and the oil refinery at Heuelva.

Total sales for the Cros group in 1986 were Pta 67.2bn. Fertilizers accounted for 59 per cent of the total, chemicals 18 per cent, drugs 8 per cent and agrochemicals 3 per cent.

AIR LIQUIDE SELLS U.S. UNITS

Air liquide has sold four industrial gas units to US-based Trigas to comply with US federal trade commission requirements after the French firm's $1.1bn takeover last year of Big Three Industries.

Air Liquide says that through cash raised from the sale of some of Big Three's operations together with the company's contribution to cash flow, it has clawed back nearly half the $500m borrowed by Air Liquide's US subsidiary to fund the acquisition.

Big Three's Texas and Louisiana-based units are said to be producing some 19,000 ton/day oxygen and nitrogen to supply petrochemical operations in the Gulf of Mexico. Air Liquide has described the prospects for expansion as very favourable.

BP BOOSTS FAR EAST BUSINESS

BP detergents has continued its recent expansion push in the Far East with the acquisition of an Indonesian contract manufacturer, PT Wheelock Marden Indonesia. Terms are not disclosed, but a BP spokesman said the price was less than £10m ($16.5m).

Jakarta-based Wheelock is an Indonesian manufacturer of household and personal care products which it makes for a number of leading international groups. The BP spokesman said Wheelock will continue to make products for outside firms but a major share of its output will be used by BP companies.

Last month, BP acquired Malaysia-based Unza group which makes a similar range to Wheelock. The UK-based group is hoping to continue this expansion in order to take advantage of the growing Far East market.

UK, EEC TO EXAMINE EXPLOSIVES CARTEL CLAIM

Both the UK and EEC competition authorities are to investigate Swedish allegations that a number of European explosives manufacturers have operated price fixing and market sharing cartels.

The UK office of fair trading (OFT) and directorate general IV of the European commission, have requested information from the Swedish competition watchdog, Naringsfrihetsombudsman which has made the allegations following an investigation into illegal arms shipments.

A spokesman at the OFT said that it is too early to say whether any action will be taken. An EEC official echoed this view but said the commission has no power to investigate military trade. DG IV would, he said, examine the information to see if it involves industrial and engineering explosives.

According to the Swedish authority, documents seized from Nobel Industries point to the existence of three cartels covering propellant powders, the explosive PETN, and the plastic explosive RDX.

The documents cover the period from 1981-85 and suggest that along with Nobel's Bofors division, PRB of Belgium, France's state-owned Societe Nationale des Poudres et Explosifs, Switzerland's Societe Suisse Explosifs, Italy's Dinamite and the UK's Nobel Explosives Co — a unit of ICI — and Norway's Dyno Industrier were all members of at least one cartel.

Extracts from the Swedish ombudsman's report detail dates, and contents of meetings at which prices were allegedly fixed, target prices set, and market-sharing arrangements agreed.

The most significant of the three cartels, or "clubs" as they are described in Bofors' documents, concerned propellant powder producers. This operated within the European association for study of safety problems in production and use of propellant powders (EASSP).

This organization is an affiliate of the federation of European explosives manufacturers (Feem), which itself is a sector group of Cefic, the European council of chemical manufacturers' federations.

A Cefic spokesman said that while EASSP was "affiliated," it was not controlled by Cefic. "Our policy is quite clear. The EEC competition laws must be obeyed. We condemn any illegal cartel activities," he said. EASSP is run by the companies involved in Feem, he continued: "It is not our responsibility, but we expect Feem to put its own house in order."

A spokesman for PRB, a subsidiary of Belgium's Gechem group, said the company had no comment to make on the allegations.

At ICI, a spokesman restated company policy that employees are forbidden to involve themselves in any price fixing or market sharing activities. Reports suggest that in 1984 ICI chairman John Harvey-Jones warned employees that they would be fired if they attended any explosives "club" meetings.

DSM SEEKS NEW SPECIALITY ARM

DSM is looking for a speciality chemicals acquisition to provide the group with a "third branch of high value added" operations, according to chairman Hans van Liemt. He also indicated that the target would be outside the Netherlands but not in the US.

Speaking after the announcement that the Dutch chemicals group will be partially privatized next year, van Liemt said that the acquisition would be financed from existing funds. This suggests that such a move would not be of "big bang" proportions. However, the DSM chairman indicated that if, following privatization, an opportunity for a major takeover presented itself to the company then a fund-raising share issue would be considered.

On the issue of privatization, van Liemt said the company would be protected from hostile takeovers by the certification of shares and issuing preference shares.

NOBEL IN BID FOR SADOLIN

In a move designed to broaden its penetration of the Scandinavian paints market, Sweden's Nobel Industries has made a Dkr625m ($89m) bid for Danish coatings producer Sadolin and Eolmblad.

Nobel has already acquired an 18 per cent equity stake and 22 per cent of Sadolin's voting rights from Denmark's Hafnia Bank. It also has an agreement to acquire Norsk Hydro's 10 per cent share in the Danish firm, which shows Dkr2bn sales and Dkr20m profits.

The Swedish group's paintmaking activities are part of the Casco Nobel division which also produces adhesives.. Total sales were Skr3.1bn in 1986 with profits of Skr279m. Casco's Nordsjo unit controls 25 per cent of the Swedish paintmarket.

If Nobel succeeds in its bid for Sadolin, it will gain 43 per cent of the Danish paint market and a 7.5 per cent slice of the Finnish market.

ERBAMONT TO LIFT FARMITALIA STAKE ?

In a move aimed at taking full control of drugs subsidiary Farmitalia Carlo Erba, Erbamont NV has requested that trading of shares in the Italian firm be suspended.

Erbamont is soon expected to announce a public offering for the 25 per cent of Farmitalia it does not own. The value of this stake is estimated at L600bn

Erbamont, with operations centred in the US and Italy, is said to have taken the decision in order to bring Farmitalia in line with its US-based drug subsidiaries — Adria Laboratories and Kallestad Diagnostica — both 100 per cent-owned.

Montedison, which has an 84.6 per cent stake in Erbamont, has denied reports in the Italian press that it plans to sell the pharmaceuticals firm and says any future moves would strengthen its interest in the company.

TRI DROPS BID FOR FERMENTA

Trans Resources Inc. (TRI) of the US has dropped its Skr1.38 bn ($215.6m) bid for Fermenta after objections from some of the Swedish biotechnology and chemicals group's bank creditors.

Industrivarden, Fermenta's main shareholder, and TRI have issued a statement saying "due to the unwillingness of certain of Fermenta's Swedish banks to consent to TRI's proposed method of repaying bank loans of Fermenta, TRI is unable to proceed."

AHP MERGES UNITS

American home Products Corp has merged its two pharmaceutical subsidiaries in an effort to stimulate new product research and development. At the same time, the New York-based drugs and consumer products group has agreed to acquire VLI Corp, a contraceptive sponge maker, for $86m.

The two drugs units, Wyeth Laboratories and Ayerst Laboratories, will have combined annual sales of $2.5bn. The merged division will be renamed Wyeth Ayerst Laboratories.

IMC SALE PLAN

Following a round of major restructuring, International Minerals and Chemicals (IMC) of the US is planning to sell a "substantial proportion" of its fertilizer subsidiary to the public. Terms have yet to be finalized.

IMC's fertilizer business has been showing signs of recovery recently. In the 1986-87 financial year IMC Fertilizer group posted operating earnings of $67.1m compared with a loss of $61m the year before.

US MELAMINE FIRM GOES PUBLIC, TO BUILD UNIT

Melamine Chemicals Inc., the joint venture set up in 1968 by Ashland Chemical and First Mississippi Corp, has gone public. An initial public share offering has reduced the two parents' combined stake to just over 48 per cent and raised between $35-40m.

Donaldsonville, Louisiana-based Melamine will receive up to $18.7m of the offer proceeds and will use part of the money to acquire the existing melamine plant from the former parents. Around $7.5m will be used to build a new process plant that will expand existing capacity from 32,000 ton/year to about 45,000 ton/year.

Melamine's president, Roger Thomas says the new plant will be built by an affiliate of the Bechtel group and will be on stream in 1988. The new process technology has been developed by Melamine over a five-year period and Thomas claims it offers capital savings of 20 per cent and even greater energy savings.

The company has applied for patents for the technology which is high-pressure, non-catalytic and simplifies purification and crystallization.

Melamine is used in baked enamel paints for automotive production, laminates, wood panelling, unbreakable dinnerware and adhesives. According to Thomas, the world market is around 363,000 ton/year and is growing by 4 per cent a year. Consumption has grown in Europe and the Far East and there is little idle capacity worldwide, he says.

In 1987, Melamine Chemicals sold a record 36,000 ton of product. The previous high of 25,000 ton was achieved in 1973.

For the year ended June 30, 1987 Melamine Chemicals posted sales of $30.2m and profits of $4.5m. Last year profits were $1.5m on sales of $19.5m. The company's main competitor in the US is American Cyanamid.

POTASH EMBARGO THREATENED

Saskatchewan Premier William Devine has threatened to embargo all US shipments of potash from his province if the US commerce department decides to impose anti-dumping penalties against Canadian potash producers.

The province is the sources of almost all Canadian potash shipment and it supplies around 80 per cent of the US potash market. In response to complaints from two US producers, the US commerce department recommended a scale of tariffs ranging from 9.14 per cent to 85.2 per cent against Canadian producers.

Devine said that no decision would be taken pending free trade talks between the US and Canadian governments at Cornwall, Ontario.

PPG Industries, the Pittsburg-based chemicals, paints and glass group, has reached agreement to sell its Saskatchewan potash subsidiary Kalium Chemicals to Sullivan and Proops of Chicago.

Terms were not disclosed, but sources suggest a figure in excess of $100m. Potash accounted for less than $100m of PPG's 1986 sales figure of $4.7bn.

Despite the depressed state of the potash market, Kalium has reportedly been profitable.

BETZ BUYS COAL MINING CHEMICALS

Consolidating its leadership position in the area of water treatment for the coal mining industry, Betz Laboratories has acquired the US coal mining speciality chemicals business of Calgon Corporation. The deal follows Betz's recent purchase of a similar business from Dow Chemical.

Jim Hartley, general manager of Betz's mining business said: "Calgon has worked hard over the years to develop and produce a quality polymer product line for this market." Under the agreement, all Calgon mining products will be retained as well as the key employees associated with the mining business.

SIR OFFERS TO BE EXAMINED SOON

Offers for Italian chemicals group SIR, with a value put at over L330bn ($249.5m), are due to be examined at the end of

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his month. There are five proposals to purchase the entire group which comprises about 30 operating concerns, many in the chemicals sector, plus a series of companies under liquidation. A further 16 offers involve only parts of the group.

SIR says it broke even last year on sales of L380bn. But, sources say this result was only made possible because the committee which rescued SIR from bankruptcy and now holds a 60 per cent stake in the company waived repayments of between L35-40bn.

UK AEROSOL MAKERS BACK CFCs BAN

The UK aerosol industry has given its support to the United Nations environment programme (Unep) initiative aimed at reducing the world wide use of chlorofluorocarbons (CFCs) over the next decade. A proposal to reduce CFC use in stages is expected to be signed during the current UN meeting in Montreal, Canada. Scientific evidence suggests CFCs damage the ozone layer.

In a statement, the British aerosol manufacturers association (Bama) said it "fully supports the Unep programme." But it also points out that the European aerosol industry as a whole has sought to reduce its consumption of CFCs and has cut the use of CFCs 11 and 12 by over 30 per cent since 1980.

According to Bama, over a third of UK-made aerosols contain no CFCs. And of the total £800m worth of aerosols sold in the UK annually, almost half contain no CFCs. But Bama also points out that CFCs are vital propelling agents in pharmaceutical, personal care and some industrial product aerosols. At present, says the association, there is no substitute product available.

Between 1976 and 1985, sales of European community-made CFCs to the aerosol industry dropped from 176,914 ton/year to 117,642 ton/year, a fall of 33.5 per cent. But sales of CFCs to EEC foam plastic producers rose 76 per cent over the period, and the consumption within the solvents and refrigeration industries rose 19 per cent and 17 per cent respectively. Exports of CFCs outside the EEC jumped 28 per cent from 84,000 ton to 107,500 ton over the nine years.

FERRUZZI TO BUY CPC STARCH UNIT

Italy's Ferruzzi group has agreed to acquire CPC International's European starch business for over $600m. The deal, which is the largest international acquisition by any Italian company, is expected to close on September 30.

According to Ferruzzi, a giant agro-industrial conglomerate, the business will operate under the name Cerestar.

Cerestar makes starches, glucose syrups, fructose, dextrose, sorbitol and derivatives which are used in a number of industries including chemicals and pharmaceuticals. The company operates in all western European countries, has 13 production plants and an R&D centre in Belgium. It is headquartered in Brussels and has sales close to $1bn a year.

Ferruzzi, which owns a controlling stake in Montedison, says Cerestar's investment programme will not be interrupted and a new facility is planned for Manchester, UK.

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Chemical Markets Abroad

GLOBAL METHANOL BUSINESS RECOVERS

After several years in the doldrums it now looks as though the global methanol producing industry is on the road to recovery.

According to US consultant Crocco & Associates, with strong demand for methanol in traditional chemical derivatives fast expanding demand for MTBE production and the almost complete rationalization of the industry, methanol producers are now in fairly good shape. The situation is also favourable for methanol consumers who can take advantage of more reliable global supply options.

The results of Crocco's 1987 methanol annual study indicate a supply/demand tightness in the early 1990s. It points to the need to start planning additional production now for the next decade. Global methanol capacity utilization is around 88 per cent in 1987 but is likely to increase to around 94 per cent by 1990. This could cause future supply dislocations, especially as the only new worldscale methanol plant under construction is located in Chile, a long distance from the major consuming markets in Europe and the US.

WORLD METHANOL SUPPLY DEMAND BALANCE (000 TON)

	Est	Forecast	
Demand	1986	1987	1990
Formaldehyde	4,690	4,765	4,914
DMT	617	621	656
Acetic acid	927	1,014	1,395
MTBE	1,185	1,536	2,357
Methyl methacrylate	391	379	388
Gasoline/fuels	1,980	2,176	2,295
Solvents	1,774	1,812	1,985
Others/various	4,108	4,057	4,684
Non-tabulated countries	210	220	255
Total demand	15,672	16,586	18,929
Nameplate capacity	20,608	20,005	21,182
Capacity at 90 per cent	18,547	18,005	19,064
Per cent utilization at nameplate	76	83	89
Per cent utilization at 90 per cent nameplate	84	92	99

Source : Crocco & Associates Inc

DUMPING CLAIMS

Canada's department of national revenue is investigating claims of urea dumping by East Germany and the Soviet Union in Eastern Canada, following a complaint by CIL, Toronto-based affiliate of ICI.

The Canadian import tribunal is currently examining alleged material injury to CIL. If the complaint is upheld, the tribunal is likely to recommend punitive rates of duty.

Canada is also probing alleged phenol dumping by Spain after a complaint by Montreal's Kemtec Petrochemical Corp. The import tribunal is expected to take up to four months to reach a decision in this case, but in the meantime, dumped imports of phenol will be subjected to a provisional duty.

CRACKER START-UP

Petromont, the Montreal-based petrochemical producer, is putting the finishing touches to a propane cracking unit due on stream in November. The unit will use propane delivered by a converted oil pipeline.

Petromont estimates that it will save around Can$1/barrel ($0.77) over the present cost of propane delivered by rail car. It predicts that the move, plus modernization will make the facility as cost effective as any other North American olefins plant.

Next year, Petromont plans to restart two polyethylene reactors moth-balled since 1982, raising its ldPE capacity from 70,000 to 130,000 ton/year. The restart, including related debottlenecking, will cost Can$8m.

SABIC SAYS PLANTS RUNNING 'NORMALLY'

A statement issued from Riyadh concerning the effect of the accident which destroyed a Saudi gas separation plant reads as follows: "Sabic plants have not been affected by the recent accident at Ju'aymah and continue to operate normally for all products, Sabic assures its customers of its ability to meet commitments and provide product support worldwide."

Several contradictory reports from close observers in the internal marketplace suggest that the two giant crackers at Al Jubail are still operating at just

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News from the American Market

JAPAN'S SULFUR MARKET REMAINS TIGHT

The Japanese sulfur market is tight, compared with others around the world, and prices are holding. Recovered sulfur is now selling in Japan for about $198/metric ton. The country's sulfur production, entirely from fuel oil desulfurization plants, has been falling because of lower refinery operating rates. Refinery output dropped to 59% of the 4.7-million-bbl/day capacity in fiscal 1986, which ended Mar. 31, 1987, compared with 62.3% in the previous fiscal year. Sulfur recovery fell to 985,000 m.t. in the period, from 1.044 million m.t. the previous year. The Ministry of International Trade and Industry forecasts, moreover, that sulfur recovery is likely to drop to 927,000 m.t. in fiscal 1987. Exports of sulfur, primarily to South Korea, are expected to drop to 69,000 m.t. in fiscal 1987, compared with 97,000 m.t. in the 1986 period.

PRICES OF CAUSTIC SOAR IN EUROPE

European producers of caustic soda are riding the same wave of price recovery as U.S. producers. Spot prices for liquid caustic soda (100% basis) are now in the range of $200-250/metric ton, f.o.b. northwest Europe, an increase of 100-150% from levels at the end of 1986. In West Germany, spot prices are now $219-246/m.t. ($=1.83 German marks), delivered, up 14-29% from the start of the year. Producers now hope for a further 12% hike in Oct. Underpinning the producers' price push are low stock levels — the lowest in five years — and continuing healthy demand for caustic in such sectors as aluminum production.

JAPANESE BUYERS PLAY CATCH-UP ON POTASH

Japan's potash buyers are catching up after waiting for lower prices because of the rising value of the yen. Japan's Ministry of Finance says that potassium chloride imports rose to 593,903 metric tons in the first six months of 1987, compared with 477,290 m.t. in the year-earlier period. Potassium sulfate imports rose to 105,829 m.t. from 64,314 m.t. Japan has no domestic potash production.

DU PONT PLANS A JAPANESE FLUOROELASTOMERS UNIT

Du Pont Japan Ltd. will build a plant in Japan to make Du Pont's Viton fluoroelastomers. The unit is expected to come onstream within the next three years and will serve the Japanese and other Asia-Pacific markets. Du Pont now makes fluoroelastomers in its Chambers Works at Deepwater, N.J., and at Dordrecht, the Netherlands. The polymer is currently shipped to Japan where it is custom-compounded and sold by Du Pont-Showa Denko, a 50-50 venture of Du Pont and Showa Denko. The joint venture built a 900-metric-tons/year Viton compounding facility last year at Kawasaki. It operates a 20,000-m.t./year neoprene chloroprene rubber plant at the same site and has used butadiene as feedstock since 1972, when it switched from acetylene. The company also imports Hypalon chlorosulfonated polyethylene, ethylene-propylene-diene-monomer rubber and ethylene-acrylic rubbers for resale in Japan.

ATOCHEM RAISES PHOSPHORUS PENTOXIDE TABS

Atochem, Inc., a U.S. subsidiary of France's Atochem SA will raise off-list prices of phosphorous pentoxide by 7 cent/lb effective Oct. 1. The company says the increase is needed t recover rising raw material costs and to restore margins, which have eroded during the past several years. Atochem says it intends to boost prices to liste levels with another increase i mid-1988, moving the price fo truckload quantities of 39,99 lb to 82 cent/lb. Phosphorus pentoxide is used in the synthesi of phosphate esters for flame retardant and plasticizer applications.

ARCMATICS OUTPUT PICKS UP

Output of benzene, toluen and xylene picked up sharply i the second quarter, says the International Trade Commissio Benzene production in the perio reached 423.7 million lb, compared with 343 million lb in th first quarter; toluene output cam to 244.4 million lb, compare with 229.4 million lb; and xyle production was 219.6 million l compared with 78.4 million l The second-quarter surge ca ried first-half production well b yond that of a year earlier. Ou put of benzene was up 15%, 764.8 million lb; toluene 32%, to 473.8 million lb; xy ne, up 9%, to 398 million lb. contrast, output of the two mai nonaromatic feedstocks gr more modestly in the first ha Ethylene rose 4.5%, to 16.8 b lion lb, and propylene climb

technological scene abroad

Another advance in superconductivity

Room temperature superconductivity has been repeatedly demonstrated for up to two days in several materials by researchers at Colorado State University (CSU) in Fort Collins. Moreover, the researchers have isolated the regions of the bulk materials that are superconducting at room temperature. To isolate those regions, Walajabad Sampath, a CSU professor of mechanical engineering, cooled small particles of the superconducting materials with liquid nitrogen and applied a magnetic field. The superconducting particles generated their own magnetic field, thereby repelling the applied field. That caused the particles to rotate against the applied field. Under a microscope, Sampath says, "We physically see the particles dance". The rotating particles are then separated from those that are not rotating and, therefore, not superconducting. CSU has applied for a patent on the superconductng materials — which are blends of copper, yttrium, barium and other oxides — and on the process for isolating the materials.

An expert system for manufacturing and control

New software that uses expert-system techniques to diagnose problems in power plants is bidding for a larger market. The system is used to explain differences between actual, predicted and desired performance measures. Expert-EASE Systems (Belmont, Calif.) and Neuron Data (Palo Alto, Calif.) say their new jointly developed system can be used where process models are used extensively for engineering and control. The system runs entirely on an IBM PC providing full-color graphics linked to an expert system shell. The product is expected to be available in October at prices ranging from $1,700 to $8,800, with volume discounts available.

Joint venture to develop liposomes for large animals

A letter of intent to develop liposome encapsulated vaccines and compounds for large animals has been signed by IGI (Vineland, N.J.) and Coopers Animal Health (Berkhamsted, U.K.), a joint venture of the Wellcome Foundation and Imperial Chemical Industries. The agreement calls for Coopers to make an initial payment to IGI and royalty payments on any products developed. IGI says that its liposomes are more stable than those derived from natural phospholipids. IGI's liposomes do not contain the double bonds that are found in natural phospholipids, bonds that IGI says are readily destroyed by the body. Furthermore, IGI says that its liposomes have a larger carrying capacity than do conventional liposomes and lower raw material costs.

Clinical trials for a new kind of pain killer

Schering-Plough will enter clinical trials with a new type of oral pain killer this fall. Called an enkephalinase inhibitor, the compound works by enhancing the body's own defense to pain. It causes the brain to release enkephalin, which acts on enkephalin receptors to relieve pain. However, the enzyme enkephalinase inactivates enkephalin, turning off its analgesic effect. Schering's enkephalinase inhibitor—designated SCH 34826 — kills pain by prolonging the action of enkephalin. The compound does not cause such common side effects of narcotic pain relievers as sedation, respiratory depression and constipation, says Schering. Tolerance is not developed to the compound, Schering says, adding that applications could cover the spectrum of pain, from headaches to that associated with cancer.

Beryllium production in Brazil

Brazil's Institute of Nuclear Engineering (IEN), a research centre run by the country's National Commission for Nuclear Energy (CNEN), will start producing beryllium metal this yr. on a pilot-plant scale. The metal will be used as a neutron reflector and moderator in the institute's project for a reactor to produce radioisotopes, according to Hugo Tagnin Neves, who heads up IEN's Dept. of Materials and Metallurgy. IEN is installing two furnaces, one for the production of beryllium fluoride (BeF_2), the second for reduction of the material via magnesium to the metal itself. Initial output at the plant is scheduled for sometime in September. "The critical stage of our process is the fluoride, which requires a special furnace", Tagnin Neves says. The equipment now being installed, he adds, will have the capacity to produce 4 kg./hour of BeF_2 and 5 kg./month of beryllium. "After we've defined all the parameters of the process, we'll double output to 10 kg./month," Tagnin Neves says, "and then we'll start thinking about an industrial-scale operation, to be implemented by a private company absorbing our technology".

News about new projects

TOYO/MARUBENI WIN EDC CONTRACT IN BULGARIA

Toyo Engineering and Marubeni Corp of Japan have won a Yen 1.6 bn. ($11m) contract from Chimcomplect to build a new ethylene dichloride plant in Bulgaria. The 120,000 ton/year unit will form part of a new PVC complex at Devnia. The complex will replace a similar facility which was destroyed in an explosion last year.

Marubeni was responsible for arranging the suppliers credit, according to industry sources. The 8.5-year loan from Exim Bank of Japan bears an interest rate of 4.7 per cent. Repayment will commence after the start up, due in Sept. 1988.

Product from the EDC plant will be purchased by Marubeni and sold on markets outside the Comecon. When the VCM/PVC complex is built in 1991 the EDC will be used on site.

Decision on the VCM/PVC complex meanwhile is due within the next few weeks. This project, valued at $250-300m, will be set up on a turnkey basis. It will comprise units for 150,000 ton/year of vinyl chloride monomer, 120,000 ton/year of suspension PVC and 20,000 ton/year of PVC paste.

Final negotiations are under way with four groups including Uhde/Hoechst/B. F. Goodrich; Toyo Engineering / Marubeni Corp; Chisso Engineering/B. F. Goodrich and Technipetrol/Klockner.

The Uhde team is proposing the Hoechst / Goodrich VCM technology with Badger providing extended basic engineering for oxychlorination, and the Hoechst/Uhde PVC process.

Toyo/Marubeni are in with the Mitsui Toatsu VCM and Shinetsu PVC processes; Chisso Engineering is offering the B. F. Goodrich VCM and PVC processes, Technipetrol the PPG Industries VCM and Klockner the Huls PVC processes.

The complex will be fed with ethylene from a 150,000 ton/year ethylene plant now under construction at Burgas. The unit is being supplied by M. W. Kellogg, Kawasaki Heavy Industries and Mitsubishi Corp. Chlorine is available on site.

At Burgas plans are in hand to build an acrylic fibres complex with a capacity in excess of 10,000 ton/year and a 500,000 ton/year ldPE unit.

CABOT TO BUILD PLANT IN FRANCE

Cabot Corporation of the US has announced that subject to final approval by the French authorities, its United Chemical subsidiary will build a new carbon black production unit at Port Jerome. The project, the company says, will include a significant upgrading of ancillary process equipment.

The new unit, with a capacity of 27,000 ton/year, will be operational in September 1988. It will use the company's own process technology and produce a range of grades.

Cabot acquired United Chemical from Ashland two years ago. The plant is one of the largest in Europe. Cabot's other carbon black facilities in Europe are located at Berre, also in France; Ciervana, near Bilbao, Spain; Stanlow, UK; Botlek, the Netherlands; Hanau, West Germany; and Ravenna, Italy.

Cabot is the largest supplier of carbon black to the European market, which is estimated to be around 1m ton/year. Over the past five years the European carbon black market has recovered steadily and is now growing at 1 per cent/year. The rubber industry accounts for over 90 per cent of the total demand.

SAUDI ARABIA INVITES BIDS FOR FERTILISER COMPLEX

Saudi Arabia's National Chemical Fertiliser Co. (Ibn Al-Baytar) is set to make its first downstream investment. It has invited contractors to bid for a major fertiliser complex at Al Jubail. Closing date is end of September 1987.

Companies invited to bid for the project, estimated to cost between $ 100m-$ 150m, are Spain's Dragados & Construcciones, Japan's Toyo Engineering, Hitachi and Chioyda, Italy's Technipetrol and West Germany's Uhde.

The project calls for the construction of plants to produce 1,500 ton/day of NPKs, 1,100 ton/day of diammonium phosphate or 850 ton/day of triple superphosphate and 30 ton/day of liquid NP fertilisers. In addition there are also plans to build a 1,500 ton/day urea plant but this unit may be realised at a later date.

Contractors have been asked to propose two alternative schemes — turnkey lump sum and cost plus fee.

The project also includes substantial offsites and utilities such as storage, desalination and other facilities required for a grass roots complex.

The plants will be fed on ammonia produced at a newly commissioned 500,000 ton/year plant. This unit, built by Toyo Engineering, was completed on

August 15 and is a already operating at near capacity. Until the downstream plants are built in 1989, Sabic will market the ammonia internationally.

Ayad A. Al-Rashid, Ibn A-Baytar's president says that the demand for potash and phosphate rock will be approximately 90,000 ton/year each and about double that amount of phosphoric acid. Potash and phosphates will be imported from the world market, he says.

Although a considerable amount will be consumed on site, ammonia will remain an exportable product for the company. The project will be financed by the partners, Saudi Industrial Development Fund and by commercial bank loans. Most up-to-date technologies for each plant are acceptable, Al-Rashid said.

Dragados is proposing Incro technology for the NPK, DAP and liquid fertiliser units, Snamprogetti for urea and NSM for urea granulation. Incro, a 50-50 joint venture of Cros and Intecsa, both of Spain, is a part of Dragados.

The same technology combination is being quoted by Technipetrol. Jacobs may provide technology for TSP.

Uhde will probably quote AZF technology for DAP and TSP, its own NPK and Stamicarbon urea processes. Toyo engineering normally quotes Mitsui Toatsu for urea and Norsk Hydro for NPKs. Hitachi could join forces with Kellogg, as it had done on several occasions in the past.

Formed in 1985, Ibn Al-Baytar is a joint venture between Sabic and Safco (The Saudi Arabian Fertiliser Co.). The company's ultimate aim is to supply the fertilisers to the domes-

YORKSHIRE IN UK, US PROJECTS

Yorkshire Chemicals, one of the world's leading suppliers of sulphone chemicals, is going ahead with plans to treble capacity in the UK and is at an advanced stage of discussions with a US company to produce sulphones in the US.

The UK firm is spending £2.3m on a new plant at Selby, North Yorkshire and has awarded the contract to Ventron Technology of Stockport. Completion is due in the second quarter of 1988.

Phillip A. Lowe, chairman of Yorkshire Chem., said that new products will include ethoxylated and tetramethyl sulphones for such end uses as photographic materials and performance plastics. The company's lower grades are used in textile auxiliaries, tanning materials for the leather industry and thermal papers.

Yorkshire Chemicals, Lowe said, is in detailed discussions with a US firm. These could be finalised in two or three weeks and lead to contract manufacture starting early next year.

There is a shortage of these materials on the world market and producers could sell as much as 50 per cent more. Existing producers include Konishi and Nikka of Japan and Crown Zellerbach of the US. The latter has been moving in and out of the market. These producers, Lowe stresed, supply product for sale, there are other producers of sulphones which use their output in-house.

AIDS RESEARCH HELPS REPLIGEN

Repligen's collaboration with Merck in the search for an Aids vaccine has led to a substantial gain for the former in net income after a payment of $5.2m by Merck during the genetic engineering company's first fiscal quarter. Merck is due to make a further payment to Repligen during fiscal 1988 taking the total to $7.5m.

Total revenues for the three months were put at $6m compared with $973,000 in the same period last year, Repligen said, while net income turned round from a $908,000 loss to a profit of $3m.

The Cambridge, Massachusetts-based firm said product sales and contract revenues also contributed to the gain in income, and added that it would be receiving further financial support for research during the year. In addition, Merck will be making lump sum payments on Repligen's achievement of certain scientific goals.

TURKISH VACCINE UNIT PLANNED

Institut Merieux, a subsidiary of France's Rhone-Poulenc, has signed an agreement with the Turkish government to set up a vaccine production facility in Istanbul.

An initial three-year investment of FF200m ($33m) will cover firstly the packaging of Institut Merieux vaccines with a second stage involving the production of anti-rabies and anti-measles vaccines in Istanbul. Turkey currently has the second highest number of rabies cases after Thailand.

A third stage will involve the transfer of technology on blood derivatives. Institut Merieux says that further investments will be made when the three-year programme is finished.

biotechnology

MIXED GROWTH FORECAST FOR FERMENTATION MARKET

At present, the US market for fermentation products and processes is highly variable, according to a new report from consultant Business Communications Co. While the total value of these products was around $39bn at the end of 1986, growth rates varied from 18 per cent for speciality enzymes to declines of 2 per cent for monosodium glutamate (MSG) and hormones. Sales for all these products have grown only slowly — 3 per cent a year — since 1984, and BCC suggests that this rate may slow to between 2-3 per cent through 1992.

The report, **Modern Fermentation Processes and Products,** says that some products, such as fermented foods and established pharmaceuticals such as hormones and antibiotics, will have slower than average growth. But newer products such as microbial interferon will enjoy faster growth.

Turning to specific market sectors, BCC says that food and feed supplements will show markedly different growth rates. While food products are part of a mature market which is labour-intensive and relatively slow-growing, feed additives are newer products and will grow twice as fast.

Since 1984, the value of fermented foods and feed supplements has grown on average by 1.6 per cent a year from $31bn. to $32.6bn. But the report notes that growth will not be much better through 1992 — perhaps

The supply of fermented foods is growing faster than demand and prices and values will suffer, BCC says. In the cheese, beer and wine sector, lower-price items will be hardest hit, losing market share to imported cheeses and premium beers.

Growth in feed lysine will increase, according to the report, but at a slower rate than predicted three years ago. BCC estimates that the growth will be "a modest 3 per cent" as a consequence of lower farm incomes. By the end of this year the value of the lysine market will be around $62m and is expected to reach $72m by 1992.

For fermentation pharmaceuticals and biological products, the US market value is currently around $4.9bn, up from $4.5 bn in 1984. But within that annual average increase of 4.5 per cent are products which are declining in value.

Fermentation antibiotics — accounting for over 90 per cent by value of sales in this sector—fluctuate cyclically according to BCC. And their development cycle is finite because micro-organisms do acquire resistance to them and they must be replaced. The report forecasts that the highest growth will be anti-tumour products — 18 per cent a year up to 1992. Within immunotherapeutics, microbial interferon will grow from $75m in 1987 to $300m by 1992.

In contrast, the market value for fermentation hormones and vitamins is dropping. This is mainly due to a long-term decline in the average dosages of cortisone and oral contraceptives prescribed by doctors, the report points out. The decline is forecast to reverse itself by 1992, but BCC reckons that average growth for fermentation hormones will be less than 1 per cent a year.

In the speciality and bulk/organic chemicals sector, the annual average growth is forecast around 4 per cent from $1.3bn. to $1.6bn by 1992. Organic acids and alcohols are expected to increase by 3 per cent a year at most. Enzymes will continue to show growth. BCC says amylase will grow with the food processing industry and protease sales will rise slightly faster as this product is also used in detergents. Enzymes used for biomedical applications, however, will increase at the rapid rate of 20-25 per cent per year. For polymer biomaterials, BCC forecasts average increases of 4 per cent to 1992.

MARKET VALUE OF FERMENTATION PRODUCTS, 1987-92 ($m)

Product group	1987	1992	Average annual g.r. (%/yr.) '87-92
Food and feed products	33,562	36,474	1.6
Pharmaceuticals	4,942	6,066	3.2
Speciality and bulk chemicals	1,332	1,618	4.2
Totals	39,836	44,158	2.0

US APPROVES CHOLESTEROL DRUG

Officials at the US food and drug administration have, as expected, approved Merck's cholesterol lowering drug lovastatin. Clinical tests suggest that the drug is able to reduce cholesterol levels by 18 to 34 per cent.

One possible problem with the drug, however, is that prolonged use is required to maintain the lower cholesterol level. The FDA recommends that the drug should only be given to those individuals who have difficulty in cutting blood cholesterol levels by dietary and other non-pharmacological means such as exercise.

Lovastatin works by blocking a key enzyme, HMG CoA reductase, involved in cholesterol biosynthesis. This property has the knock-on effect of cutting low density liporotein levels which should substantially reduce the risk of coronary heart disease.

Merck is also investigating the possibility of lovastatin reversing the clogging of arteries. Pharmaceutical analysts are not united in their forecasts for sales. The most bullish projections suggest sales of about $1bn by 1991 although the reluctance by doctors to prescribe long-term therapies and the increase in healthy diets may restrict sales to about $130m.

The US drugs firm has applied for marketing approval in seven European countries and patent issues may restrict sales to those markets. Merck has, however, a second generation product, velistatin, which has a patent position and should overcome these problems.

PHARMACIA PLANS ENTRY INTO AIDS TEST MARKET

Pharmacia, the Swedish biotechnology and pharmaceuticals group, is planning to launch two third-generation Aids tests. Originally developed by Syntello, a Gothenburg-based research group, one test is specific to the HIV-1 virus and the other to the HIV-2 virus, both of which can cause Aids.

These third-generation tests are based on a peptide sequence of the virus coat belonging to a stable region which is specific to the particular virus. These properties reduce the risk of false positive reactions which can occur if the test traps other antibodies.

Pharmacia has recently completed a full evaluation of the peptide technology and claims that no false positive reactions were recorded and that the increased sensitivity reduces the risk of false negative reactions. First-generation tests were based on the actual viral coat proteins with the second generation coming from recombinant coat proteins.

Both Pharmacia and Syntello are now planning to scale-up production of the tests and if it proceeds smoothly, market introduction in some West European countries could take place by next year. Pharmacia obtained access to the technology when it bought global marketing rights from Syntello's financial backer, Virovahl.

Pharmacia is encouraged that the tests identified antibodies to the HIV-1 virus at an earlier stage in the disease than existing products. "If this sensitivity can be maintained in largescale production, and there are good reasons to believe that this will be the case, this factor will be of great importance in testing blood for transfusions", the company claims.

Until a year ago Pharmacia would not have entered the Aids tests market, according to Elof Johansson, company executive vice-president and head of research, but the acquisition of diagnostic group LKB last year, and the 20 per cent holding in Eni, the US diagnostics group brought access to critical technologies. Moreover the Swedish firm received a Skr 17.5m ($2.8m) grant from the Swedish industrial development fund to develop Aids diagnostics.

The LKB acquisition included the Finish instrumentation firm Wallac which has developed Delfia, a highly sensitive test system based on immuno fluorescence. "We now have access to the various assay systems to offer radio immunoassay in Japan, fluorescence assay for Western Europe and special instrument assay systems for the US", added Johansson.

Currently, the market for HIV tests is growing at a rate of 15 to 20 per cent/year with a global market already worth about $75-100m. Eni already holds about 15 per cent of the US market and Pharmacia is hoping to capture a similar share of the global market with the new te-

Environment

DUTCH FIRMS PROPOSE PHOSPHATE COMPROMISE

Detergent and soap producers are claiming that the proposed ban on phosphates n detergents will not solve the phosphate pollution problem in the Netherlands. Instead, the Dutch association of soap producers (NVZ) and Hoechst Holland are offering to make a financial contribution to the cost of building water treatment systems to reduce the pollution.

While the offer has been welcomed by the Dutch economic affairs minister Rudolf de Korte, environment minister Ed Nijpels warns that phosphate use must be curbed soon or the ministry will push for a total ban. The economic affairs ministry warns that a ban will have a serious effect on jobs and the investment climate for the chemical industry in the Netherlands.

NVZ claims that a total ban on phosphates in detergents would solve only about 8 per cent of the problem. About 55 per cent of phosphates enters the Netherlands via large rivers such as the Rhine with the rest coming from animal and human excrement.

Furthermore, a ban would not neutralize the problem caused by phosphates when they occur in high concentrations at certain key locations. More and better water purification installations at these critical sites, NVZ argues, would be much more effective.

The association claims that the soap industry has already cut the phosphate content in detergents by 40 per cent in the past ten years. Over the same period the government has done little to improve water purification.

The only Dutch phosphates producer Hoechst Holland, which has a 75,000 ton/year facility at Vlissingen, echoes the soap producers' views. Hoechst commissioned a study to look at the cost of building adequate water purification sysems for phosphates at critical points in the Netherlands waterways.

Horringa & De Koning, the consultancy commissioned by Hoechst, concludes that Dfl.60m to 100m ($29-48m) phosphates, can be recovered from the waterways. Hoechst Holland has now offered firms to help pay for such a project.

Hoechst Holland is currently in a very awkward position. A few months ago its West German parent's phosphor plant in Knappsack, near Cologne, burned to the ground, just after the Dutch subsidiary closed one of the three phosphor ovens in Vlissingen in response to market conditions.

The Dutch facility could take up the slack caused by the disabled West German unit but Hoechst AG now prefer to wait until the Dutch position is clearer. A total ban may force Hoechst to close the Clissingen plant with the loss of about 900 jobs.

SWEDEN PLANS NEW WASTE LAW

Sweden's Environment ministry is drawing up plants to curb the dumping of hazardous chemical waste and clean up existing sites. According to Birgitta Dahl, the minister responsible, all dumping should cease and the clean up will probably take about 20 years.

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Dahl argues that current legislation to prohibit the dumping of environmentally dangerous waste, introduced in 1969, has proved to be inadequate. The government is now planning to bring in tougher legislation and more adequate protection procedures.

WINEMAKER SUES CHEVRON CHEMICAL

Chevron Chemical is facing a $57m lawsuit from a French wine producer which alleges an agrochemical, produced by the company, has ruined wine produced at the vineyard in the three years from 1983 to 1985. Lawyers representing Chateau Phelan Segur from the village of Saint-Estephe in south west France claim that Chevron's **Orthene-50** has spoiled the vintages.

The Chateau is seeking to recover $7m in actual damages and $50m in punitive damages from the US firm. The suit highlights tests carried out at the Reims university of science linking the odour in the wine to acephate, the active ingredient of the insecticide.

Once Chevron Chemical had been informed of possible problems, the company withdrew the recommendation to use **Orthene-50** on grapevines. "This is simply a prudent business decision and does not imply any liability," a Chevron Chemical spokesman said.

Chevron Chemical is contesting the suit, claiming that its tests indicate the odour problem is not linked with the chemical but with the Chateau's own wine-making process. While admitting that other complaints had been received from other vineyards Chevron Chemical believes that its position is not endangered as millions of other bottles of wines have been produced from **Orthene-50** treated grapes without problem.

FORMALDEHYDE CURB

Plans by the West German government to cut by half the maximum permissible concentrations of formaldehyde in the workplace have met with considerable opposition from the plastics and wood industries.

In letters to the federal ministry of labour and the committee on dangerous substances within the MAK commission, the body responsible for setting limits, the industry associations have asked for more time to state their case. The associations claim that the new limits would force firms to make substantial investments and in some cases are technically unfeasible.

In the labour ministry's view, however, the industries have had "sufficient time" to make their view known. A controversial report published by the federal health authority and the federal environmental authority in 1984 urged a cut in permissible formaldehyde limits in closed rooms and chip board in wall panelling and furniture.

Currently the limit stands at 0.1ppm but if the new restrictions become law, West German production of formaldehyde could drop by about one-third from the 1984 level of 500,000 ton/year.

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in the european market

Heightened hostilities in the Gulf and renewed uncertainty over crude prices have encouraged **naphtha** to fluctuate in quite a wide band over the week. Top prices were $162/ton, but most numbers were in the high $150s. Spot prices of LPGs have remained steady even though customers of Saudi firm Petromin have had September allocations cut 15-25 per cent.

Some major cracker closures in Europe, notably Neste, DSM and Mossmorran, and consequent tightening of supply have helped lift **ethylene** spot prices to a range of $500-510/ton in North West Europe. CdF Chimie at Carling, Marathon and Texaco all have closures scheduled over the next two months. Although the Saudi production picture is still not clear, it has become evident that ample stocks are tiding customers over at present, although traders expect some supply disruption to derivatives later. European ethylene has been diverted to spot sales in the Far East.

Propylene has not been affected by the anticipated supply tightening in the ethylene market and prices have slipped to DM 480-500/ton under poor demand prospects. Traders report offers at DM 480/ton cif Rotterdam and DM500/ton from the West German market but consider DM 510/ton to be unrealistic.

Butadiene demand is still strong in major markets outside Europe, leaving prices slightly up on last week at $530-545/ton.

Benzene prices have moved up slightly since Shell stopped selling into the market. $265/ton is widely quoted, with $270/ton possible.

Toluene prices at $205-215/ton allow plenty of room for hydrodealkylation to benzene. Demand from the gasoline pool is weak. Cargoes have changed hands at $208/ton.

Styrene is still tight, with T1 in a range of DM 1,110-1,130/ton. Sadaf in Saudi Arabia seems to have plentiful stocks and shows no signs of supply disruption. Nevertheless, fear of such a situation is keeping prices up. T2 prices are $1,250/ton. The improvement in the EEC styrene industry and a decrease in US imports has prompted the EEC commission to propose cancellation of the existing anti-dumping duty on styrene from the US. A decision is awaited from the council of ministers imminently.

Xylenes prices have weakened to $242-246/ton in a slack market.

Orthoxylene is in oversupply and prices have now slipped below the $300/ton mark.

Paraxylene prices have also slipped under weak demand and are put at $320-340/ton, although the lower number has not been seen in the market yet. There has been some demand for September from India.

Methanol prices are steady at $120-125/ton fob for T2 and $107-109/ton cif North West Europe for T1, with steady demand from the chemical industry and good indications for long-term demand.

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News from Japan

M'shi Stepping Up Overseas Ion-Exchange Resin Business

Mitsubishi Chemical Industries Ltd. has concluded a formal contract to supply Sam Yang Co. (S. Korea) with through-production technology for anionic ion-exchange membranes. The Japanese company is giving technical instruction to Sam Yang workers at its Kurosaki factory and the S. Korean company will complete a through-production system next year.

Demand for the products is expanding in S. Korea along with development of the food, pharmaceuticals and electronics industries. Sam Yang has called on Mitsubishi Chemical — Japan's largest ion-exchange resin maker — to provide the said through-production technology.

Both companies established some time ago a business tie-up with regard to marketing of synthetic-fiber material. The S. Korean company has been commercializing cationic ion-exchange resins with related technology introduced from the Japanese company.

On the other hand, Mitsubishi Chemical is contemplating inaugurating ion-exchange resin production in North America since Dianex Systems Ltd., jointly established by the company itself, Nippon Rensui Co. and Gaco Systems Ltd., (Canada), is smoothly pushing forward market exploitation there. The joint company has been emphasizing marketing of specialty ion-exchange resin, uniform granular resin in particular, for use in, for example, separation/refining of isomerized sugar.

Mitsubishi Chemical has a Taiwanese susidiary engaged in cationic/anionic ion-exchange resin production.

It aims at joining the world's top-ranking ion-exchange resin makers — Dow Chemical and Rohm and Haas (both U.S.), etc. — by building up production bases in Japan, S. Korea, Taiwan and North America. It will further promote production activities abroad since direct exports of ion-exchange resins from Japan are increasingly less profitable amidst the shifting of production by domestic user industries to foreign countries.

Japan's Big-2 Paint Makers Pushing High Tech. Specialties

Kansai Paint Co. and Nippon Paint Co., Japan's big-2 paint makers, are now implementing business activities under their new medium or long-term programs. Both are determined to strengthen corporate structure by diversification particularly through moves into the high-tech and specialty fields on the grods that the paint business characterized by a large share of material cost in the total production cost as well as intensive competition has little room for producing higher-added value at present and in the future.

Kansai Paint marking its 70th anniversary this year is carrying out its 5th 3-year business program which started last April. Under the program sales and ordinary profits for the final fiscal year ... fiscal year 1989 — have been set at Y150 billion and Y6 billion, respectively. The strategy for the period in question is to expand and strengthen "new business" featuring marking films, superheat-resistant paints, de-icing agents, enzyme immobilizing systems and IC-substrate materials. Sales of these new lines are planned to earn about 20 percent of the ordinary profits set for the final year of the plan.

It will also invest actively in R&D. Of about Y14 billion equipment investment planned for the 3-year period, 50 percent will be spent for expansion and improvement of research facilities and new business.

On the other hand, Nippon Paint worked out last year its 10-year business program under which it is attempting to expand nonpaint lines. Although targets for sales and ordinary profits for the period are not revealed, priority has been placed on expansion of areas other than paints which include functional coating materials, organic ultrafine particles, colour matter to be obtained via mass culture of plant tissues, application of a blood coagulator to cosmetics and drugs.

For fiscal 1995 the share of sales of nonpaint lines in the total has been set at 25 per cent but that of ordinary profits, at as much as 50 per cent.

Nippon Paint also intends to expand, by more than 3 times, sales of its group companies as a whole in the 10 year period by raising management efficiency and increasing co-ordination among group companies under a comprehensive strategy.

Drastic Structural Reform Re-commended for Fiber Ind.

Japan Chemical Fibers Association has compiled a report entitled "Change in environment of Japan's chemical fiber industry and its future prospects." It pointed out that the industry has been stirred up considerably by the high-flying yen and the rapid development of the fiber industries of nearby countries and thus stressed the necessity for the Japanese industry to implement drastic form, streamline supply routes and improve processing methods so as to add higher value to products as well as seek appropriate co-operation and fair competition with South Korean and Taiwanese counterparts.

It says fiber-product trade has been strictly controlled in most countries — Western, developing and Communist bloc countries — and only a very few advanced countries, including Japan, and Hong Kong have opened their markets. Such import restrictions, especially the U.S.'s control, are expected to continue for a long time.

Synthetic-fiber business in the West enjoyed profit growth as a whole in 1986 thanks to import control and the following factors: (1) substantial improvement in production facilities, (2) increased operating rates mirroring demand recovery and (3) reduced material cost. In and after the 1970s synthetic-fiber industries in Taiwan, South Korea and China have expanded. Turning to production capacity in 1986, the U. S. ranked first with 2.92 million t/y; followed by Japan with 1.35 million t/y; Taiwan, 1.23 million t/y; South Korea, 0.85 million t/y; and China 0.85 million t/y. Taiwan was the largest exporter in the year (11-% share of global exports) and China, the largest importer (23%).

Despite the yen's strength, Japan's fiber and fiber-product exports to South Korea and Taiwan have expanded along with an increase in exports from them, and the trade gap in Japan's favor is likely to increase in future. This shows their large dependence on Japan for materials and intermediate products, the report says.

Maker and Sales Firm Set up Joint Plastic Drum Company

Mitsui Petrochemical Industries, Ltd., Nittetsu Steeldrum Co. and Kokan Drum Co. have established a joint venture, Nippon Plastic Container Co., for manufacture and sales of plastic drums in Japan. Demand for plastic drums is likely to expand sharply in the near future due to the revision last July of two ordinances related to the Fire Service Law which allow plastic drums to be used as containers for some dangerous chemicals for land transportation. They have been used since two years ago as containers for such chemicals for marine transportation.

This step is intended to carry out plastic-drum business in an aggressive manner by combining Mitsui's plastic-processing techniques and the marketing capability of the latter two companies.

The new company will construct facilities in Osaka costing about Y 500 million and capable of producing 200-l high-density polyethylene drums at the rate of 180,000 pieces a year. It hopes the facilities will be put into full operation in 4 or 5 years. It also plans to establish a production base near Tokyo.

Mitsui has imported an L-ring drum (closed-type plastic drum) manufacturing process from Mauser-Werke GmbH of West Germany for this project.

Nihon Cement Establishes New Fine Ceramics Firm

As a part of its policy for expanding its fine-ceramics business, Nihon Cement Co. has established a new company and is to build a fine-ceramics factory.

Since the company branched out into fine-ceramics in 1983, it has manufactured various engineering ceramics on an experimental basis and has been delivering samples.

However, the company has become unable to meet user's needs, so it has established a new supply base and has decided to develop its business activities as an integrated ceramics manufacturer.

At present annual sales for the ceramics are Y 300 million. The new company expects the annual sales of the products to reach Y2 billion three years hence and Y 10 billion eight years hence.

The new company named Nihon Ceratec Co. is Nihon Cement's wholly owned subsidiary and is capitalized at Y 100 million. The head office is located at Nihon Cement's Sendai branch. Location of the factory's site is now under examination and will be decided shortly.

The new company will start functioning with 80 employees working in development, manufacturing and business sectors.

The factory is to be specialized in engineering ceramics such as alumina, silicon nitride, zirconia and silicon carbide. Consruction for it will start in October and it will go into operation next April.

SAUDI ARABIA PLANS SOLVENTS FACILITY

Saudi Arabia has invited companies to quote for a new solvents plant. Safco, the main investor, plans to build a 70,000 ton/year plant at Yanbu to produce mainly white spirit and aromatic solvents.

The French group Total will hold a 10 per cent stake in the venture. Other investors include the Saudi Xenel group and other private interests. Total's subsidiary Societe de Hydrocarbures de St Denis is providing the process technology.

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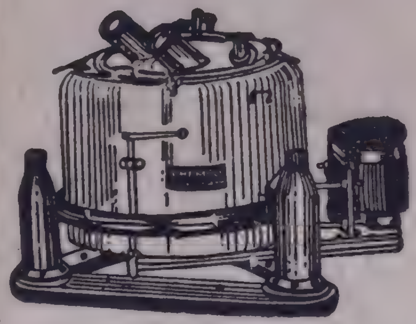

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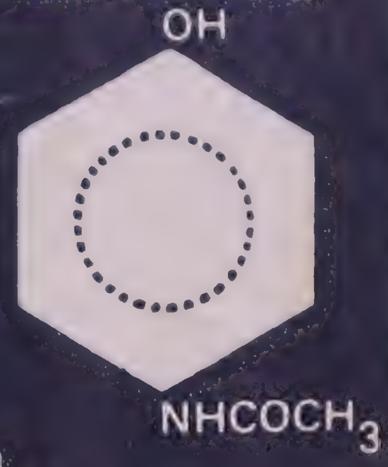

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New Developments from Japan

Tough PP Filament For Carpet Pioneered : Mitsubishi Rayon

Mitsubishi Rayon Co. has developed a high-performance polypropylene (PP) filament having nearly the same Young's modulus as nylon 66. The company has installed a manufacturing plant at its Toyohasi factory (Aichi Prefecture).

It has produced the new fiber by increasing the degree of molecular orientation of already commercialized "Pylen" PP fiber and thereby raising the Young's modulus concerned. Further details, however, have not yet been announced.

The new fiber is tough and can be used as carpet material after being subjected to a mechanical crimping process that increases the fiber's bulkiness. It also has chemicals/weather resistance and antistatic properties, all of which are peculiar to ordinary PP fiber.

Mitsubishi Burlington Co. — a joint venture between Mitsubishi Rayon and Burlington Industry (US) — is planning to market this October for commercial use carpets produced from the new PP fiber. The planned carpet will be priced at Y6,200/ m^2, about 30 percent lower than the price of conventional nylon-based carpets.

PP filament-applied carpets have yet to be commercialized in Japan but account for 35 percent of commercial-use ones in the U.S. (nylon-based products account for the balance). PP filament has hitherto been used for interior carpets for automobiles but has been said unsuitable for heavy-duty commercial-use carpets since its Young's modulus is low.

Mitsui Toatsu Markets New Nonagrochem-use Insectide

Mitsui Toatsu Chemicals, Inc. has tied up with Mitsui Pharmaceuticals Inc. to cultivate new uses other than those of the agrochemical field for ethofenprox (brand name for agrochemical use : Trebon), a pyrethroid-based insecticide developed and commercialized using the company's own technology, and has developed a new-type insecticide which is not for agrochemicals use and the two companies have started selling it.

Earlier on great expectations were placed on ethofenprox as an insecticide effective against flies and cockroaches as well as ticks on animals because of its excellent physical properties.

As the first step, in cooperation with Shinnipponkako & Company, Ltd. and Rainbow Yakuhin Co., Mitsui Pharmaceuticals Inc. has started selling the insecticide.

In contrast to conventional pyrethroid-based insecticides, all of which have ester bonds, ethofenprox has ether bonds. Furthermore, it displays a wide insecticidal effect and excellent fast-acting properties and long-lasting residual effect.

Mitsui Toatsu has constructed a 300/t/y ethofenprox (technical) plant at its Omuta factory, (Fukuoka Prefecture) and is manufacturing four agrochemicals with a single active ingredient and twelve mixtures and is marketing them.

It has been paying attention to nonagrochemical fields for some time and, jointly with Mitsui Pharmaceuticals, is going ahead with applied development of ethofenprox.

Matsushita Elec. Develops Organic Superconductor

Matsushita Electric Industrial Co.'s Semiconductor Research Center has started developing a superconductor that can be made from an organic material at room temperature. The company wants to develop an organic superconductor with a long normal-chain structure using the Langmuir-Blodgett's (LB) membrane technique which is seen as a next-generation membrane-making technique.

It is said that it is difficult to form the ceramic superconductors now studied actively over the world into fine rods. If Matsushita Research Center's attempt proves successful, this problem will be definitely resolved paving the way for the commercial manufacture of a new super-conductor.

The new superconductor will be made of a polymer of the organic polydiacetylene family, featuring both double and triple bonds in the molecule. Matsushita's Research Center plans to utilize the double bond features in making the superconductor. In detail, it will have a molecular structure consisting of a normal chain of single-bonded carbon atoms on the one hand and a carbon atom array linked by double bonds on the other hand.

Polydiacetylene polymers and most other organic substance have electron clouds revolving around the carbon atoms. These electron clouds have no resistance, and therefore do not generate heat. This particular feature led the Matsushita researches to the idea of utilizing organic substances for developing a super-conductor.

The only problem is that the double bonded part must be very long, or else the superconductor will have a resistance at the bonded sites. Moreover, it is difficult to make these polymers by standard polymerization methods, since the double bonds are apt to shrink.

Matsushita researchers are confident that they are able to resolve this problem by using the LB membrane technique, a method of preparing single atom overlay membrane, by which single molecules are arranged on a surface and polymerized. The research staff is confident that it will logically be possible to make an organic superconductor consisting of organic compounds with long normal chain in which the carbon atoms are linked by double bonds.

Tough competition is now underway to develop superconductors using ceramic materials in place of conventional alloy materials. While the problems of temperature conditions and electric current density have been overcome to a significant extent, thin layer and rod making techniques still need further improvement. Matsu-shita's activities and progress in this field are therefore a matter of great interest.

Mitsui Pharmaceuticals inducts Swiss Technology

Mitsui Pharmaceuticals, Inc. announced that it has recently introduced from Sapos S. A., in Switzerland technology for febarbamate, an agent used to suppress excitement and depression in old people and will tackle the domestic development of the agent. It has been learned that the agent shows almost no adverse effect, and the company sees that the new drug is very promising as the aged population has been increasing. The agent was developed by Sapos and has been placed on the market as a single preparation in Switzerland. It is also sold in a few European countries in the form of a combination drug.

According to Mitsui Pharmaceuticals, the agent has the same basic structure as that of barbituric acid used as a minor tranquilizer and features pharmacological actions of both emotional sedation and adjustment. It has been usual to use agents for the treatment of excitement and depression separately. Conventional major tranquilizers show adverse effect such as the extrapyramidal tract, while anti-depressants show dysuria and circulatory disorders. Thus, it has been pointed out that they can be easily used for old people. Meanwhile, data show that the new drug has almost no adverse effect, and can be regarded as a safe drug.

Because of these features, Mitsui Pharmaceuticals has decided to introduce technology for the drug and to tackle its domestic development. The company says that it is planning to start clinical tests within the next year and will file an application for the drug sometime between 1991 and 1992.

The Japanese company regards anti-cancer, circulatory, and psychological agents as its main-line products in new drug development, and as part of this policy, the company will hasten the development of febarbamate.

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SUMMARY OF THE CHAIRMAN'S SPEECH AT THE SECOND ANNUAL GENERAL MEETING

The project for the manufacture of 50,000 tonnes per annum of methanol based on naphtha as feedstock is in progress. In this connection, I would like to inform you that the Government has realised the importance of Petrochemicals in meeting the varied requirements of the common man and had constituted a Committee comprising of Senior Officials to recommend ways and means to reduce the prices of Petrochemical based products. The Committee, appointed by the Government, has recommended that the price of Naphtha for petrochemical use, should be reduced and the same is under active consideration of the Government. In this regard, I would like to mention that we have already made representations to the Government for the reduction of price of Naphtha and as per the indications presently available, we are quite confident that the Government will opt for a significant reduction in the price of Naphtha for petrochemical use and this will have tremendous impact on the profitability of the Company.

In our communication to our shareholders, towards the end of the last year, we had mentioned that the project is likely to be commissioned by first July of this year, but this schedule could not be adhered to due to undue delay in the supply of certain equipments by vendors. However, constant supervision and control at everystage, has enabled the Company to complete the mechanical erection within a period of about 18 months which indeed is a laudable achievement since a Project of this size in petrochemical field normally takes three years for completion. The foreign technician from Lurgi GmbH, the technical licensors, has already inspected the plant for process adequacy and, I now have great pleasure in announcing that testing and trials have commenced and as per the present estimates, I am quite confident that commercial production can be attained in November 1987.

Inspite of the best efforts on the part of the management to contain the expenditure there has been an increase in the project cost to the extent of about Rs. 320 lacs. As already mentioned in the Directors' Report, a major portion of the overrun in the cost of the Project is on account of increase in the rate of customs duty from 55% to 85%, weakening of rupee against Foreign Currencies, additional expenditure on installation of sophisticated fire fighting and effluent treatment systems and additional liability towards stamp duty. I would now like to inform you that the overrun in the cost of the project, has been approved by the financial institutions and the cost overrun of Rs. 320 lacs

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POINT DESIGN

will be financed to the extent of Rs. 54 lacs by way of unsecured loans from promoters and the balance by way of Rupee Term Loans from the financial institutions.

As intimated to you earlier, we have obtained the approval of the Central Government for the enhancement of the licensed capacity of Methanol from 50,000 tonnes per annum to 1,00,000 tonnes per annum and we are now awaiting clearance from environmental angle from the State Government which is expected very shortly. A decision regarding implementation of this expansion programme will be taken by the Board after all necessary approvals have been obtained. The Company has set up a comprehensive Research and Development Division under a very Senior Technologist for the identification of viable downstream projects and you will be intimated as soon as any firm decision is taken in this regard.

BOMBAY DYEING TO SPEND RS 40 CR IN EXPANSION

The expansion of the DMT plant of Bombay Dyeing & Manufacturing Co. Ltd. by 40,000 tonnes to one lakh tonnes per annum is estimated to cost Rs. 40 crores and expected to be completed in about two years.

The company has already received the government's endorsement to increase the capacity to one lakh tonnes per annum.

Disclosing this, the chairman, Nusli Wadia, told shareholders at the annual general meeting at Bombay recently that the company's DMT plant at Patalganga was currently working at more than 100 per cent capacity. Its output during the first eight months of 1987 totalled 40,500 tonnes, or an average of 5,062 tonnes per month, against the capacity of 5,000 tonnes a month.

The off-take of DMT was very good and the demand for this basic raw material was expected to remain high. Even the commissioning of the indigenous PTA capacity would not affect the off-take of DMT as the market itself was expanding in a big way, he added.

Mr. Wadia visualised encouraging prospects for the company for the current year although he did not reveal the earnings for the first half of the current year as demanded by several shareholders.

He disclosed that the company's sales during the first five months (April to August 1987) of the current year totalled Rs. 119 crores against Rs. 97 crores in the corresponding period las tyear. Of this, sales of DMT accounted for Rs. 53 crores and textiles Rs. 66 crores.

The company's turnover during 18 month period ended March 1987 amounted to Rs. 326 crores, of which DMT sales accounted for Rs. 101 crores.

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The prices are inclusive of Excise and Maharashtra Sales Tax.

Auxiliary duties push up prices

The recent announcement of increase in auxiliary duties on imported chemicals had marginally pushed up the prices in the Bombay chemicals and dyes market.

While caustic and soda ash remained steady titanium dioxide continued to be in short supply at increased prices. Chlorine shortage has not eased yet. N-Butanol was also in short supply.

The dye intermediates were in limelight. With the recent increase in the price of cyanuric chloride, many items moved up. The dyes were normal with good turnover.

(Prices as on 30th September, 1987)

INDUSTRIAL CHEMICALS	Per kg.
Ammonium sulphate	2.00
Ammonium phosphate (Mono)	14.50
Ammonium phosphate (Di)	12.00
Ammonium carbonate (Di)	17.00
Ammonium bicarbonate	4.75
Ammonium chloride	5.75
Ammonium nitrate	4.50
Arsenic white powder	21.00
Acrylamide	57.50
Barium carbonate	6.00
Bleaching powder (33% Cl)	4.00
Borax (Granular)	14.00
Borax (Powder)	15.50
Boric acid (Tech.)	22.00
Bisphenol-A	60.00
Butyl carbitol	35.00
Caustic soda (Flakes)	7.60
Caustic soda (Solid)	7.75
Caustic soda (Lye)	6.00
Calcium chloride 70% (solid)	3.25
Calcium chloride 75-80% (fused)	3.50
Calcium chloride 96% (Anhydrous)	5.00
Calcium carbonate (PPT)	3.00
Calcium carbonate (Activated)	3.55
Camphor (Indian)	86.00
Cresylic acid	49.00
Cream of Tartar (Tech.)	64.00
Citric acid (Belgium)	40.00
Citric acid Indian	40.00
Copper sulphate	15.75
Chromic acid	40.00
Cyanuric chlorids	95.00
Cobalt oxide	280.00
Carbitol	54.00
Dicalcium phosphate (Anhydrous)	16.00
Ferric chloride (Lumps)	5.50
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Menthol bold	235.00
Menthol crystal bold	375.00
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	15.00
Maleic Anhydride (per kg.)	50.00
Mercury (75 lbs)	5,500.00
Nickel chloride	49.00
Oxalic acid	24.00
Peppermint oil (Rectified)	100.00
Potassium carbonate (Indian)	19.00
Potassium carbonate (Imported)	21.00
Potassium bichromate	22.00
Potassium phosphate (Mono)	14.00
Potassium phosphate (Di)	14.00
Polyvinyl alcohol (No. 117)	88.00
Polyvinyl alcohol (No. 173)	90.00
Polyvinyl alcohol (No. 208)	89.00
Paraformaldehyde	15.00
Phthalic anhydride 96%	23.50
Pentaerythritol	63.50
Paraffin wax	13.75
Rangolite (German)	60.00
Rangolite (Czech.)	42.00
Sodium sulphate (Fine)	4.00
Sodium sulphate (Coarse)	3.80
Sodium sulphide 50-52% (Flakes)	8.25
Sodium sulphide 58-60% (Flakes)	9.25
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite	12.90
Sodium chlorite 80% (Spain)	33.00
Sodium chlorite (50% span)	75.00
Santobrite (Indian)	36.00
Soda Ash (Tata)	3.85
Soda Ash (Birla)	3.50
Soda Ash (Imp.)	3.50
Sodium bicarbonate	5.50
Sodium bisulphite	4.50
Sodium silicate	3.00
Sodium acetate	6.40
Sodium alginate	160+ST
Titanium Dioxide (Anatase)	55.00
Titanium Dioxide (Rutile — RCR$_2$)	66+ST
Tartaric acid (Crystal)	94.00
Trisodium phosphate	4.80
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Vacuum salt	1.00
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Diallyl Phthalate	48.00
Dimethyl Phthalate	28.60
Dioctyl Adipate	52.00
Dibutyl Adipate	42.00
Dipentene	14.00
Dimethylamine 40%	12.00
Dimethylamine 60%	14.00
Ethyl Acetate	24.00
Ethyl Acrylate	46.00
Ethylene Dichloride	14.00
Ethylene Glycol	22.00
Formic Acid (Imp.)	30+ST
Formaldehyde	5.75
Glycerine (CP)	50.00
Glycerine (IW)	49.00
Hydrogen peroxide 50%	25.50
Iso Propyl Alcohol	18.50
Iso Butyl Alcohol	28.00
Monoethanolamine	46.50
Morpholine (Indian)	65.00
Melamine	36.00
Methyl Ethyl Ketone	32.00
Methyl Isobutyl Ketone	34.00
Methyl Acrylate	42.00
Methylene Dichloride	21.50
Meta Cresol	45.00
Nitrobenzene	16.50
Nitric Acid (Con.) (RCF)	2.50
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- PROPYLENE GLYCOL (Dow)
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Contact the Manufacturers:

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Masjid, Bombay-400 009.
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Polyethylene Glycol (No. 1500)	44.00
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Sorbitol	17.50
Trichloroethylene	24.50
Triethanolamine	41.00
Sulphuric Acid	2.10
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
Triethylamine	50.00
Vinyl Acetate Monomer	38.50

SOLVENTS	Per Litrte
Benzene	8.90
N-Heptane	8.00
N-Hexane	8.75
Methanol	6.75
Solvent Naphtha Heavy	9.50
Solvent Naphtha Light	8.50
Toluene	10.30
Xylene	12.00

DYES INTERMEDIATES PRICES ARE WITHOUT TAX & EXCISE	Per Kg.
Alphanaphthylamine	54.00
Aceto Acetic Ester (Methyl)	59.00
Alpha Naphthol (Imp.)	155.00
Ammonium Molybdate	170.00
Anthraquinone	80.00
Anthranilic Acid	64.00
2-Amino-4-Nitrophenol (Imp.)	140.00
Blue B. Base (Local)	235.00
Beta Naphthol (Atul)	58.00
Benzidine Dihydrochloride (BDH)	68.00
Bromamine Acid	400.00
BON Acid	112.00
Chicago Acid	275.00
C. Acid (Imp.)	260.00
Coach Acid	58.00
Cyanuric Chloride (Japan)	130.00
2, 4, DNCB	26.00
Dihydrothio PTOS (Imp.)	500.00
Dimethyl Aniline	52.50
Diethyl Aniline	155.00
Di-amino stilbene disulphonic Acid	115.00
3, 3-DCB (Imp.)	155.00
Gamma Acid (Atul)	170.00
H. Acid (Atul)	155.00
G. Salt	58.00
Isophthalic Acid	39.00
J. Acid	265.00
J Acid Urea	270.00
K. Acid	95.00
MDPS (German)	190.00
MNA	75.00
Meta Urido Aniline	130.00
MPD (Local)	120.00
MPD (German)	145.00
Naphthenic Acid	11.00
N-Methyl J. Acid	400.00
N-Methyl Aniline	160.00
Napthalene crude	13.50
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Ortho Anisidine (OA Imp.)	85.00
Ortho Dichloro Benzene (ODCB)	10.00
OT Base	93.00
Para Dichloro Benzene (PDCB)	15.00
Para Anisidine (PA-Imp.)	110.00
Para Anisidine (PA-Local)	81.00
PNA	66.00
Para Cresidine (Imp.)	325.00
Para Amino Azo Benzene (India)	120.00
PNCB	26.00
Para Amino Acetanilide	140.00
1-Phenyl 3-methyl-5 Pyrazolone	110.00
Phenyl J. Acid	300.00
Para Amino Benzoic Acid	170.00
PT Base	88.00
Rhoduline Acid	450.00
Resorcinol	142.00
Resist Salt	18.00
Sodium-Naphthionate	62.00
5-Sulpho-Anthranilic Acid	60.00
Sulpho Tobias Acid	95.00
Sulphanilic Acid	24.50
Trichloro Benzene (TCB)	15.00
Tobias Acid (Imp.)	119.00

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Bombay Dyes Markets

(Prices as on 30th September, 1987)

ACID COLOUR	Per Kg
Acid Violet 4BS	143.00
Acid Maroon V	110.00
Acid Orange II	77.80
Acid Orange IIY	63.05
Acid Red A	107.25
Crosein Scarlet MOG	155.00
Acid Scarlet 3R	99.90
Acid Red 38N	135.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Green V	330.00
Acid Patent Blue AS	250.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	121.95
Acid Black BX	98.40
Acid Black Wax	135.50
Procinil Yellow GS (I.C.I., UK)	265.00
Procinil Red GS (I.C.I., UK)	530.00
Procinil Blue RS (I.C.I., UK)	315.00
Procinil Scarlet G (I.C.I., UK)	600.00
Procinil Orange G (I.C.I., UK)	250.00
Procinil Rubine (I.C.I., UK)	550.00

DIRECT COLOURS	Per Kg
Yellow 3GX	88.10
Sun Yellow RCH	124.40
Fast Yellow GCH	141.15
Yellow CFG Hly. Conc.	312.00
Fast Yellow GS	111.65
Fast Yellow CHRS	95.45
Viscose Orange A	166.15
Fast Orange GR	133.75
Red	96.90
Dark Tan	78.25
Red IIR	72.55
Red 4B	169.10
Bordeaux BW	132.30
ast Scarlet 4BS	166.55
ed 12B	170.55
ordeux Hly Conc.	194.00
Cotton Red N	117.05
rill. Fast Helio B	278.00
rill. Fast Helio 2B	297.00
rill. Fast Helio 2RS	136.20
rill. Fast Helio BS	116.10
Brill. Violet Extra	126.40
Blue 2B	86.60
Blue G	170.50
Sky Blue FB	188.25
Copper Blue GR	147.00
Fast Greenish Blue GL	114.60
Developed Black BT	116.10
Blue NB-2B	300.20
Blue NB-2BC	185.30
Developed Black NB-BH5	185.30
Green B	111.65
Green NB-B	188.25
Green 2B-N	188.25
Brown MR	154.40
Brown CN	107.25
Golden Brown G	140.35
Catechin G	120.50
Omega Tan	126.40
Catechin GS	102.80
Black E Hly Conc.	142.60
Black E Extra Hly Conc.	142.60
Black NB-ER Hly. Conc.	310.50

DISPERSOL COLOURS	Per Kg
Yellow 6G Powder	143.80
Red B 3B Powder	247.80
Red B 2B Powder	323.20
Red CB Powder	439.15
Red D2B Powder	477.40
Violet C 4R	521.90
Blue BG Powder	235.45
Blue BN Powder	103.75
Blue D 2R Powder	476.25.
Navy BT Powder	243.90
Blue B 2G Powder	210.20
Black BT Powder	182.60
Blue BR Powder	390.20
Yellow 7GL	338.60
Yellow 5RX	218.80
Yellow 3G	367.25
Yellow	140.00
Yellow AL	135.30
Yellow Brown REL	247.50
Yellow FFL	463.60
Gold Yellow GG	259.70
Pink REL	247.00
Red REL	468.65
Red 2B	327.40
Red FB	324.20
Red Violet FBL	469.85
Orange 3R	196.65
Violet 3R	280.60
Violet 6R	485.75
Violet RL	275.45
Scarlet RR	214.86
Rubine 3B	223.05
Rubine CB	364.90
Blue GL	318.95
Blue BGF	636.55
Navy Blue RE	270.40
Brown 3REL	200.40
Black GEL	324.20
Dark Brown 3B	317.40

BASE COLOURS	Per Kg.
Fast Yellow GC	80.20
Fast Orange GC	135.45
Fast Scarlet R	166.80
Fast Scarlet RC	126.65
Fast Scarlet RCR	99.05
Fast Scarlet G	121.65
Fast Scarlet GN	91.50
Fast Scarlet GG	72.70
Fast Scarlet GGS	72.70
Fast Red B	203.20
Fast Red RC	119.15
Fast Red R Flakes	149.25
Fast Red TR	166.80
Fast Red TR Oil	183.15
Fast Red RL	237.10
Fast Red KB Oil	201.95
Fast Bordeaux GP	201.95
Fast Garnet GBC	94.05
Fast Violet B	505.60
Fast Blue BB	521.45

NAPHTHOL COLOURS	Per Kg
ASG	217.00
AS	143.00
ASSW	279.75
ABBS	188.15
ASBO	195.65
ASD	175.60
ASOL	179.35
ASTR	279.75
ASPH	279.75
ASE	196.05
ASEI	184.40
ASLB	1632.60
ASBT	1817.00
ASWG	143.00
ASSG	397.70
ASSR	480.50

PROCION COLOURS	Per Kg
Golden Yellow HR	181.80
Brill. Yellow H 4G	117.55
Supra Yellow H-8GP	168.55
Brill. Yellow HE6G	166.95
Yellow H-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	243.95
Yellow M GR	326.05
Brill. Yellow M 4G	177.10
Brill. Yellow M 8G	332.30
Yellow M 3R	217.60
Brill. Orange H 2R	241.85
Brill. Orange M 2R	313.15
Brill. Red H 7B	157.95
Brill. Red H 8B	169.45
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.30
Brill. Red H-F3B	243.45
Brill. Magenta HB	167.00
Brill. Red M 5B	98.90
Brill. Red M 8B	173.70
Brill. Pink MB	137.10
Brill. Magenta MB	121.55
Brill. Purple H-3R	180.20
Brill. Purple H-7R	175.40
Navy Blue H 3R	298.50
Brill. Blue H-GR	366.55
Brill. Blue H 5G	173.10
Blue H 5R	283.85
Brill. Blue H 7G	178.70
Brill. Blue H 7RX	358.15
Turquoise HA	234.45
Supra Blue H-3RP	335.70
Supra Turquoise H 2GP	181.50
Blue H-ERD	305.80
Navy Blue H ER	258.60
Blue H 5RX	269.30
Navy Blue M 3R	310.95
Brill. Blue MR	331.70
Brill. Blue M RX	214.20
Brill. Blue M-G	382.30
Blue M 4GD	344.60
Navy Blue M RB	318.75
Brill. Blue M GX	302.50
Blue 3R Acra Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg)	285.00
Green H 4BD	269.80
Green H-E4BI	169.80
Red Brown H 1F	143.25
Orange Brown H 2B	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS	Per Kg
Navy Blue	99 85
Green G	198.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI)	Per Kg
Yellow 5G Powder Fine	673.15
Yellow 5G Supra Disperse	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr Fine	624.35
Gold Orange 3G Supra Disp.	570.30
Brill. Orange 6R Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disc.	713.20
Brill. Purple 4R Conc Powder	470.75
Brill. Purple 3R Acra Powder	696.85
Brill. Purple 2R Hly Conc.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Conc.	625 95
Blue R Powder Fine	542.15
Blue BC Conc Pdr. Fine	522.50
Blue BC Acra Conc Pdr. Fine	762.70
Blue R Conc Pdr. Fine	577.65
Blue RR Supra Powder	629.35
Blue Conc Powder	645.80
Brill. Blue 2R Hly Conc	378 55
Brill Blue 2R Supra Disp.	115.65
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp.	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Pdr.	823.95
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Pdr. Fine	419.65
Jade Green 2G Ptg. Paste	125.40
Olive Green B Pdr. Fine	399.90
Olive Green B Supra Disp.	308.25
Jade Green 2G Supra Disp.	496.00
Jade Green XBN Supra Disp. (N)	327.30
Olive D Pdr. Fine	444.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp.	536.05
Olive R Pdr. Fine	422.95
Olive R Supra Disp.	363.90
Olive D Supra Disp.	361.70
Olive D Ptg. Paste	193.00
Olive Green B Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc	640.00
Olive Green B Acra Conc	542.75
Brown R Pdr. Fine	835.00
Brown G Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
Dark Brown 3R Pdr. Fine	685.00
Brown G Supra Disp.	449.90
Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.56
Brown G Acra Conc	733.96
Brown R Acra Conc	766.00
Grey M Powder Fine	763.80
Grey M Supra Disp.	585 45
Blue BC Acra Conc Pdr. Fine	762.70
Direct Black AC Pdr. Fine	474.70
Direct Black AC Supra Disp.	330.35
Direct Black CH Supra Disp.	393.20
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI : OCT. 1st (NNS) — Tartaric acid shot up by Rs. 100 in the local chemicals market during past week, due to poor imports, says NNS. Soda ash, caustic soda, soda bicarb. rangolite and hexamine also moved up, while ammonia bicarb, boric acid technical, paraffin wax, menthol dropped. Business was poor due to tight financial position.

Tartaric acid shot up from Rs. 6100 to Rs. 6200 per 50 kg. owing to poor imports from France, Italy and Spain coupled with poor stock position. Caustic soda solid and flakes gained Rs. 2/5 at Rs. 360 and Rs. 340 due to good soap manufacturers demand. Soda ash also moved up by Rs. 2/5 at Rs. 270/285 on poor supplies. Soda bicarbonate went up from Rs. 245 to Rs. 250. Rangolite was better by 50 paise at Rs. 38/60 per kg. on good offtake. Soda hydro sulphite improved by 50 paise at Rs. 31.00/-34.00 due to good offtake from gur manufacturers. Hexamine went up by Rs. 2 at Rs. 26 due to tight supply position. Sodium nitrite moved up by Rs. 10 at Rs. 650 per 50 kg. on good demand. Formaldehyde gained 50 paise at Rs. 6.00.

Ammonia bicarb moved down by Rs. 3 at Rs. 145 on good supplies, coupled with poor demand from bakeries. Paraffin wax drifted lower by Rs. 10 at Rs. 600 per 50 kg. on heavy arrivals from Assam. Menthol bold flake and medium declined by Rs. 2/5 at Rs. 185, Rs. 160 and Rs. 175 respectively due to good supplies from Sambhal, Moradabad, Chandosi and Rampur mandis of U.P. Titanium dioxide Anatase and RC-822 lost 50 paise at Rs. 53 and Rs. 57.50 on poor demand. Sodium sulphite moved down from Rs. 3100/3200 to Rs. 3000/3100, on poor offtake. Boric acid technical drifted lower by Rs. 20 at Rs. 980.

Dyes and colours remained unchanged.

DELHI MARKET RATES AS ON OCTOBER 1, 1987

Ammonia Bicarb (per 25 kg.)	145.00
Mercury (per flask)	6,600.00
Soda ash (per bag)	270-285.00
Ammonium Chloride (per 50 kg.)	110-180.00
Caustic Soda solid (per 50 kg.)	360.00
Caustic soda flakes (per 50 kg.)	340.00
Citric acid (per 50 kg.)	2050-2150.00
Stable Bleaching Powder Shriram (per 25 kg.)	89.00
Stable Bleaching Powder KCl (per 25 kg.)	83.00
Stable Bleaching Powder MODI (per 25 kg.)	87 00
Sod. Bicarbonate (per 50 kg.)	250.00
Sod. Hydro Sulphite (per kg.)	31-34.00
Rangolite (per kg.)	38-60.00
Boric acid Technical (per 50 kg.)	980.00
Paraffin wax (per 50 kg.)	600.00
Tartaric acid (per 50 kg.)	6,200.00
Borax Granular (per 50 kg.)	520.00
Borax Crystal (per 50 kg.)	550.00
Sodium Nitrite (per 50 kg.)	650.00
Sodium Nitrate (per 50 kg.)	410.00
Camphor Thal (per kg.)	102.00
Camphor Powder (per kg.)	90.00
Menthol Bold (per kg.)	185.00
Menthol flake (per kg.)	160.00
Menthol medium (per kg.)	175.00
Glycerine (per kg.)	45-55.00
Sodium Silicate (per quintal)	300.00
Hexamine (per kg.)	26.00
Acetic Acid Glacial (per kg.)	14.50-18.00
Copper Sulphate (per quintal)	1,500-1,800.00
Formic acid (per kg.)	32-33.00
Formaldehyde (per kg.)	6.00
Hydrogen Peroxide (per kg.)	28.00
Calcium Carbonate (per Tonne)	2,500-4,000.00
Acid Slurry Soft (per kg.)	25.00
Acid Slurry Hard (per kg.)	32.00
Phosphoric Acid (per 50 kg.)	810.00
Pot. Nitrate (per quintal)	850-1,200.00
Pot. Permangnate (per 50 kg.)	2,400.00
Sod. Bichromate (per 50 kg.)	1,025-1,125.00
Tri-sod. Phosphate (per 50 kg.)	310-330.00
Titanium Dioxide Anatase (per kg.)	53.00
Titanium RC-822 (per kg.)	57.50
Zinc Oxide (Per Metric Tonne)	28,500-32,500.00
Phenol Carbolic Acid (per kg.)	28.00
Carbon Tetrachloride (per kg.)	16.50
Chloroform (per kg.)	26.00
Sodium Sulphate (per Metric Tonne)	3,000-3,100.00
Napthalene Balls (per 50 kg.)	1,025.00

DYES & COLOUR	Per Kg.
Napthol AS	140.00
Napthol ASG	215.00
Napthol ASBS	192.00
Napthol ASTR	295.00
Napthol ASOL	176.00
Napthol ASBO	198.00

DIRECT DYES	Per Kg.
Black E. Conc.	92-150.00
Diazo Black B.T.	120.00
Green B.	115.00
Blue 2-B	86.00
Sky Blue FB	186.00
Basic Auramine 'O' Conc.	55-100.00
Basic Rhodamine B. 500%	220-300.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

Madras Market

Prices in Madras chemical market came in for steady to dull conditions during the week under review with no major changes in prices. Most of the traded chemicals remained firm around the market rates. The volume of transaction noted restricted.

The Oil and Natural Gas Commission has found traces of Helium in Ghotaru in Rajasthan. Helium is strategically important in space and underwater applications and ONGC and Bhaba Atomic Research Centre have jointly prepared a feasibility report to set up a plant to extract Helium.

Besides Ghotaru ONGC has discovered another gasfield in Rajasthan at Mauhera Tibba. The Hydrocarbon potential of Rajasthan is rated high and reserves are estimated at 100 million tonnes of oil.

The soap industry has taken a voluntary decision to reduce the prices of popular brands of toilet and washing soaps from September 28.

The Government has started proceeding to recover excess moneys from drug companies in the process of implementing the supreme court judgement.

Small scale drug manufacturers have objected to provisions of the Drug price control order announced last month.

MADRAS MARKET RATES AS ON SEPTEMBER 28, 1987

Aluminium DCL (per tonne)	1,700.00
Acetic Acid Glacial (per kg.)	13.00
Ammonium (per kg)	17.00
Ammonium Bicarbonate (per 25 kg.)	135.00
Ammonium Chloride SPIC (per tonne)	1,900.00
Ammonium Chloride Ind. (per tonne)	1,980.00
Bleaching Powder DCM (per 25 kg.)	100.00
Chromic Acid Flakes (per kg.)	24.00
Borax Granular BML (per 50 kg.)	570.00
Sodium Acetate (per 50 kg.)	200.00
Carbolic Acid (per kg.)	17.00
Calcium Chloride DCM (per 50 kg.)	200.00
Caustic Soda Solid (per 50 kg.)	355.00
Caustic Soda Flakes Andhra (per 50 kg.)	355.00
Caustic Soda Flakes Mettur (per 50 kg.)	360.00
Cobalt Oxide (per kg.)	360.00
Citric Acid Deshi (per 50 kg.)	3,400.00
Copper Sulphate (Ram) ISI (per 50 kg.)	825.00
Cresylic Acid (per kg.)	42.00
Formic Acid Indian (per kg.)	36.00
Formaldehyde (per kg.)	11.00
Hydrosulphite of Soda Imp. (per tonne)	36,000.00
Hydrosulphite of Soda Ind. (per tonne)	35,000.00
Hydrogen Peroxide BASF (per tonne)	28,000.00
Magnesium Chloride Pure (per kg.)	21.00
Oxalic Acid (per 50 kg.)	900.00
Manganese Sulphate Tech. (per 50 kg.)	240.00
Manganese Sulphate Fert. (per 50 kg)	265.00
Mercury (per 3.45 kg.)	9,000.00
Sodium Nitrate	375.00
Sodium Oxide (per kg.)	1,050.00
Phosphoric Acid (per kg.)	12.00
Stearic Acid (per kg.)	18.00
Soda Ash Tata (per 75 kg.)	275.00
Soda Ash Birla (per 75 kg.)	305.00
Sodium Bichromate (per kg.)	280.00
Sodium Bicarbonate Birla (per 50 kg.)	175.00
Sodium Bicarbonate Tata (per 50 kg.)	160.00
Sodium Cyanide Brigs (per tonne)	90,000.00
Sodium Cyanide GDR (per kg.)	50.00
Sodium Bisulphite Aswin (per 50 kg.)	185.00
Sodium Silicate (per 50 kg)	130.00
Sodium Sulphate Powder (per tonne)	3,000.00
Sodium Sulphide (S) (per tonne)	5,200.00
Titanium Dioxide (per kg.)	54.00
Trisodium Phosphate (per 50 kg.)	300.00
Urea Tech (per kg.)	185.00
Zinc Chloride Solid (per kg.)	9.00
Zinc Sulphate (Ram) (per tonne)	4,500.00
Acetone (per kg.)	29.00
Benzene (per kg.)	25.00
Carbon Tetrachloride (per 100 kg.)	1,500.00
Isopropyl Alcohol (per kg.)	40.00
Cellosolve (per kg.)	45.00
Chloroform (per kg.)	25.00
Diethyl Alcohol (per kg.)	27.00
Dibutyl Phthalate (per kg.)	31.00
Toluene (per kg.)	18.00
Sorbitol (per kg.)	28.00
Dioctyl Phthalate (per kg.)	31.00
Methyl Ethyl Ketone (per kg.)	45.00
Nitrobenzene (per kg)	11.00
Trichloroethylene (per kg.)	24.00
Triethanolamine (per kg.)	40.00
Turpentine Oil (per kg.)	7.00
Caustic Potash Flakes (per kg.)	1,000.00
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Propylene Glycol (per kg.)	26.00
Paraffin Wax (per bag)	700.00
Alkyl Benzene (per kg.)	35.00
Pentaerythritol (per kg.)	58.00
Glycerine HCL (per kg.)	48.00
Hyflosupercell (per kg.)	19.00

MATERIALS IMPORTED

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(From 28.9.87 To 30.9.87)
(Cost of Imported Item is CIF Vaue)

ACRYLAMIDE From Japan Five Star Chemicals, 1,020 kgs., Rs. 21,072; 1,020 kgs., Rs. 21,072.

ALPHA PHENYL GLYCINE : From Taiwan : Armour Chemicals, 3,000 kgs., Rs. 4,31,891.

AROMATIC CHEMICAL : From Singapore : S.H. Kelkar & Co. Ltd., 5,040 kgs., Rs. 1,04,119.

BETA PICOLINE : From Japan: Associated Chemicals, Ahmedabad, 1,140 kgs., Rs. 34,835.

BON ACID : From Japan : Colour-Chem Ltd., 6,000 kgs., Rs. 3,21,498.

CHICAGO ACID: From Odessa : Amal Rasayan Ltd., 20,381 kgs., Rs. 21,88,364.

CHLORPROMAZINE : From China : Vikas Pharml. Labs., 100 kgs., Rs. 45,529.

CITRIC ACID : From Austria : Wellman Leather Corpn., 3,750 kgs., Rs. 50,625.

CYANURIC CHLORIDE : From Japan : Riamond Dyechem P. Ltd., 5,000 kgs., Rs. 2,16,638.

CYCLOHEXANONE : From Holland : Rallis India Ltd., 5,838 kgs., Rs. 75,474; From West Germany : Pesticides India, 6,075 kgs., Rs. 80,791.

DICHLORO ACETYL CHLORIDE : From Japan : Camlin P. Ltd., 3,000 kgs., Rs. 1,06,586.

DICHLORO METAXYLENE : From UK : Tata Exports, 500 kgs., Rs. 28,492.

DICUMYL PEROXIDE : From Holland : Universal Cables Ltd., 2,000 kgs., Rs. 87,799.

DIMETHYL FORMAMIDE : From Japan : The Bhor Inds. Ltd., 15,200 kgs., Rs. 1,52,300; 15,200 kgs., Rs. 1,52,300.

DINITRO DIPHENYL SULFONE : From Osaka : Sadhana Nitrochem Ltd., 2,000 kgs., Rs. 1,03,900.

EDTA ACID : From Taiwan : Devidayal Sales P. Ltd., 18,000 kgs., Rs. 2,32,408.

ETHYLENE GLYCOL : From West Germany : Universal Polymers, 78,110 kgs., Rs. 86,587.

ETHYL THIO ETHANOL : From West Germany : Rokhadia Chemicals Co. P. Ltd., 2,400 kgs., Rs. 58,102.

FORMIC ACID : From West Germany : Raj Dyes and Chemicals, Delhi, 20,202 kgs., Rs. 1,49,151.

GLYCERINE : From UK : Glyco Labs., 20,000 kgs., Rs. 3,35,442.

HEPTONE : From USA : Indian Nissan Oxo Chemical Inds. Ltd., 2,98,077 kgs., Rs. 17,89,617.

HEXA CHLOROETHANE : From UK : Pharmakem, 900 kgs., Rs. 10,400.

HIGH DENSITY POLYETHYLENE : From Yugoslavia : Urvi Plastic Industry, 10,000 kgs., Rs. 89,682.

HYDROGEN PEROXIDE : From Italy : Kilachand R & Co. Ltd., 16,800 kgs., Rs. 1,39,909.

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(Gujarat)
Phones : 2970/2841

ISOBUTANOL : From Holland: J.K. Impex Corpn., 15,600 kgs., Rs. 1,06,577; From West Germany : Shai Gopal Inds., Copn., 13,430 kgs., Rs. 91,752. 13,430 kgs., Rs. 91,752.

ISOBUTYL : From Holland : Hindustan Lever Ltd., 129 kgs., Rs. 2,59,280.

ISOBUTYRIC ACID : From West Germany : Hindustan Lever Ltd., 1,000 kgs., Rs. 20,531.

ISOPHTHALIC ACID : From Japan : Polymers India, Ahmedabad, 7,500 kgs., Rs. 96,837.

ITACONIC ACID : From USA: PDI Chemicals P. Ltd., 250 kgs., Rs. 12,589.

LAURYL ALCOHOL : From West Germany : Galaxy Organics P. Ltd., 12,920 kgs., Rs. 2,49,745; From FRG : Galaxy Chemicals, 10,620 kgs., Rs. 1,88,450.

METANILIC ACID: From Kobe : Jeevan Products, 5,000 kgs., Rs. 1,78,713.

METHYLENE CHLORIDE : From Spain : Pharmachem Modern Inds., 19,720 kgs., Rs. 1,26,035.

NEOPENTYL GLYCOL : From West Germany : Goodlass Nerolac Paints Ltd., 2,000 kgs., Rs. 39,646.

NONYL PHENOL : From Sweden : Dura Chemicals Corpn., 5,070 kgs., Rs. 61,766.

OLEYL CETYL ALCOHOL : From West Germany : Dai Ichi Karkaria P. Ltd., 1,36,00,000 kgs., Rs. 2,77,94,762.

ORGANIC CHEMICALS: From Yokohama : Gujarat State Fertilisers Ltd., 40,000 kgs., Rs. 4,20,000.

PHENYL XYLYL ETHANE : From Japan : Universal Cables, 7,000 kgs., Rs. 1,89,800.

POLYVINYL ALCOHOL: From Japan : Impex Trading Corpn., 4,000 kgs., Rs. 79,696; 3,000 kgs., Rs. 59,773.

PROPYLENE GLYCOL : From West Germany : KEC Intl., 8,600 kgs., Rs. 86,610.

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SODIUM CHLORATE : From Sweden : Hindustan Lever Ltd., 51,000 kgs., Rs. 2,99,613.

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STEARYL METHACRYLATE: From France : Indofil Chemicals Co., 9,360 kgs., Rs. 2,73,830.

TARTARIC ACID: From France : Sharda Dyeing & Printing Works, 14,000 kgs., Rs. 5,51,064.

TERTIARY BUTYL ALCOHOL : From West Germany : Gharda Chemicals P. Ltd., 11,780 kgs., **Rs. 2,50,194.**

XYLIDINE : From Japan : Suprachem, Thana, 1,400 kgs., Rs. 52,166.

MADRAS

(From 13.8.87 To 18.8.87)

(Cost of Imported Item is CIF Vaue)

AROMATIC CHEMICALS : From USA : Ambica Chemical Products, Eluru, 397 kgs., Rs. 30,746.

BIOCHEMICALS : From FRG: University of Hyderabad, Rs. 33,491.

BIOCHEMICAL REAGENT : From USA : Centre for Cellular & Molecular Biology, Hyderabad, 1 kg. Rs. 6,143.

CHEMICALS : From USA : Kasturba Medical College, Manipal, 2 kgs., Rs. 7,223.

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33rd YEAR

CHEMICAL WEEKLY

VOL. XXXIII OCTOBER 20, 1987 NO. 6

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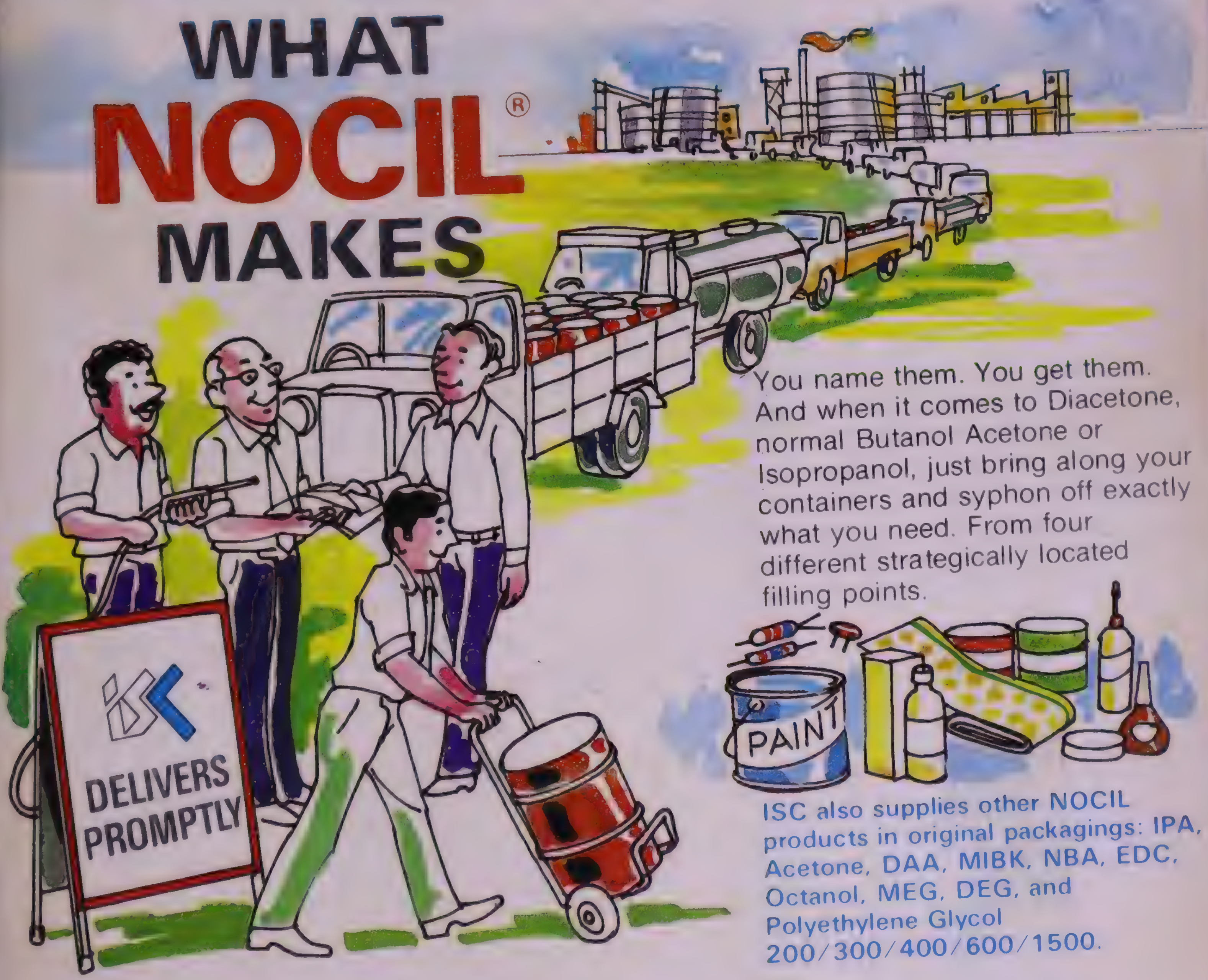

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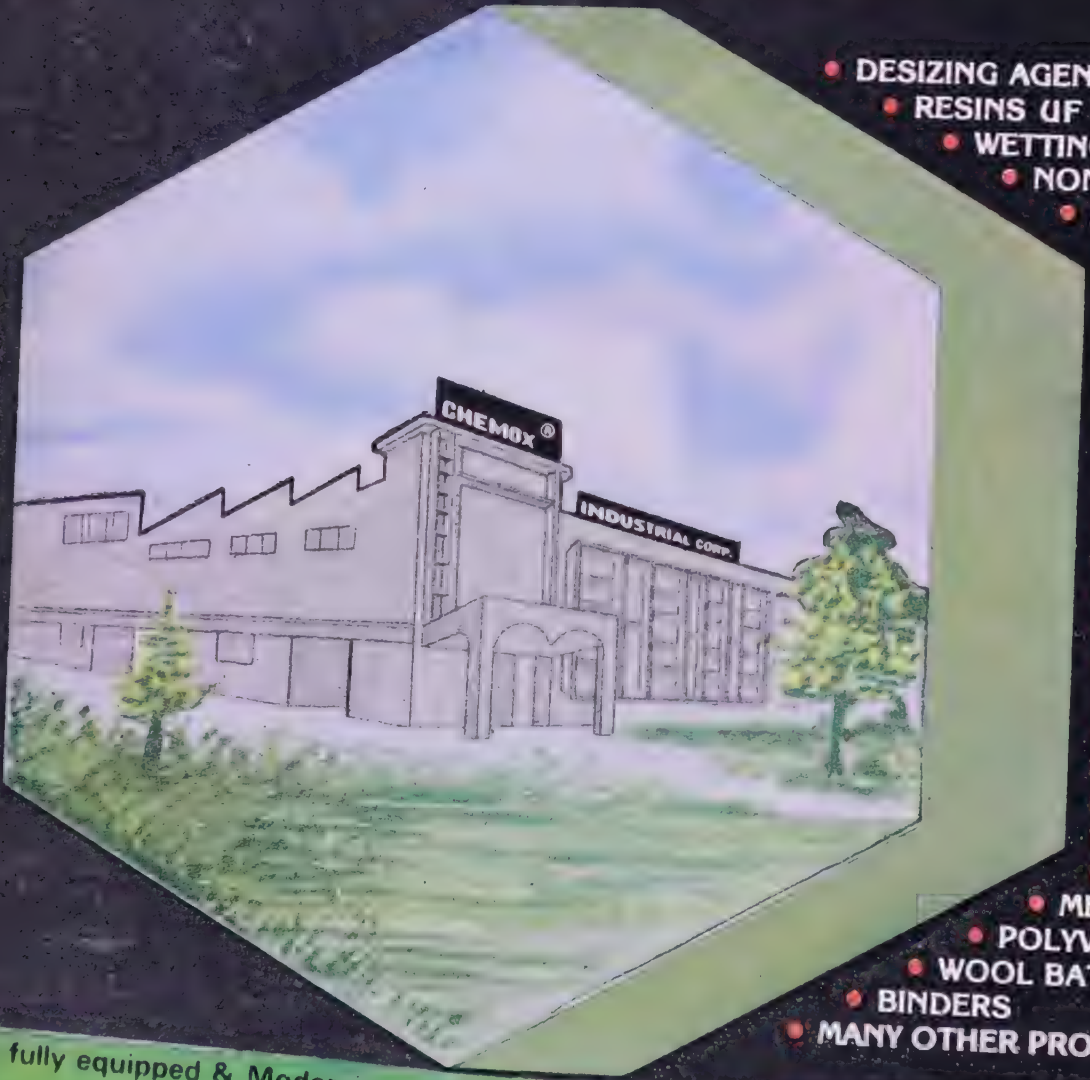

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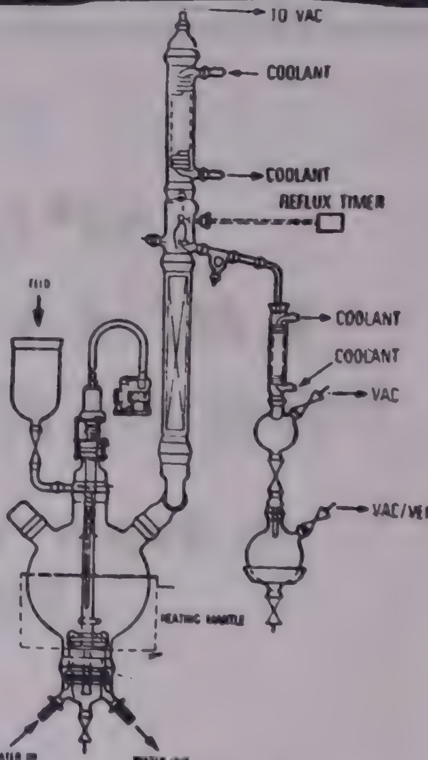

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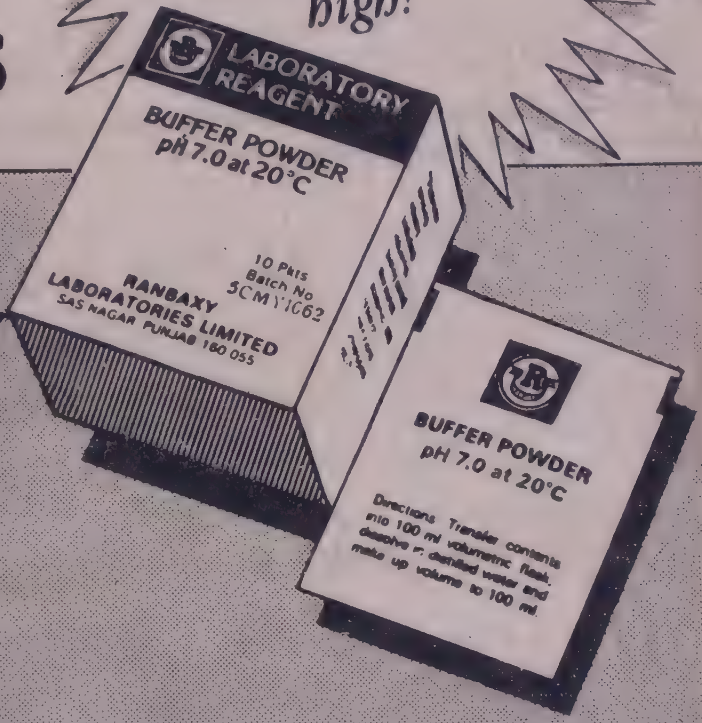
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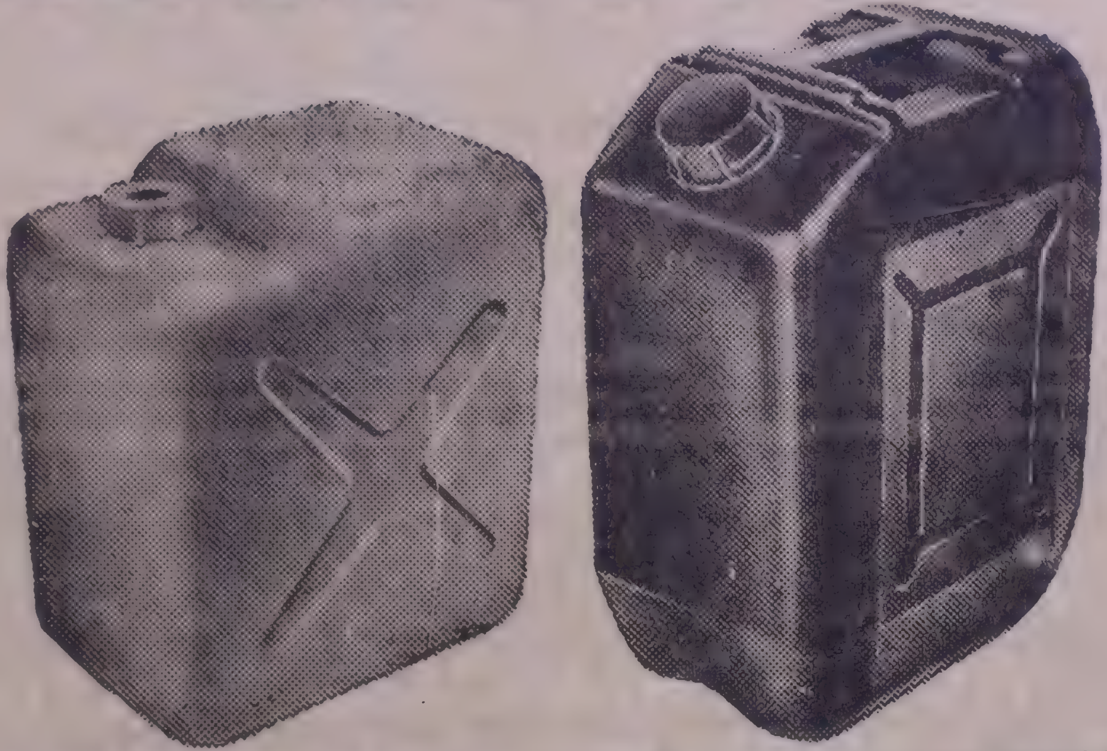

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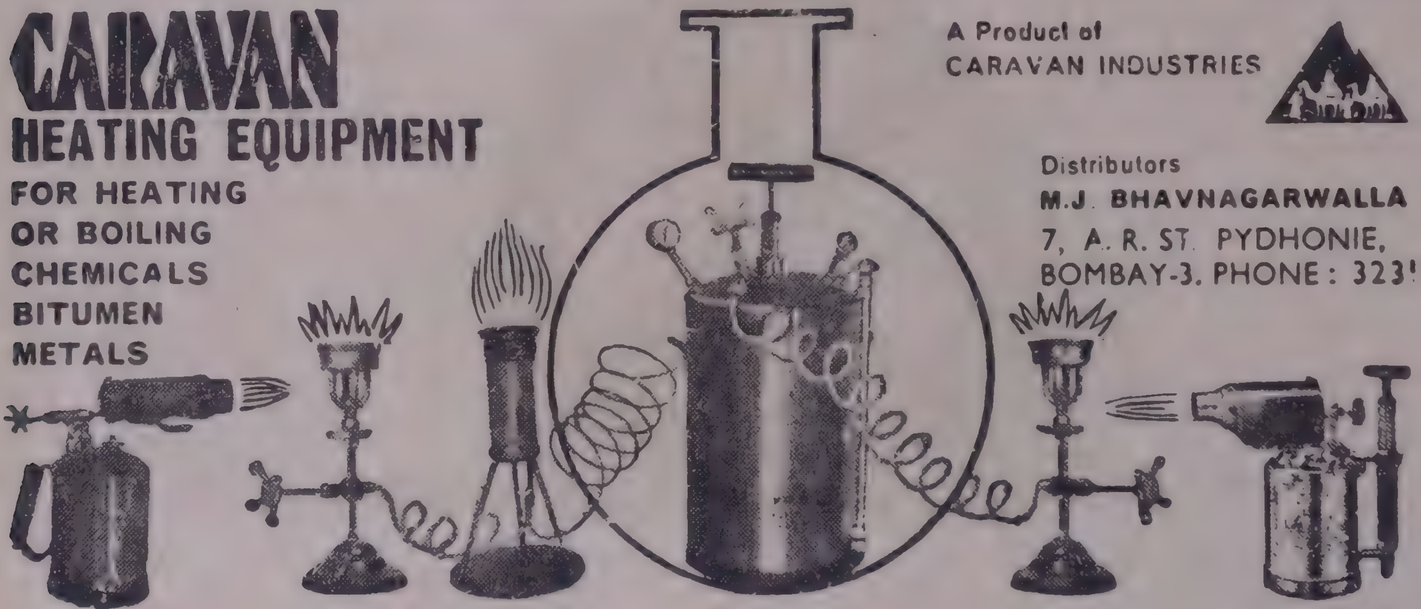

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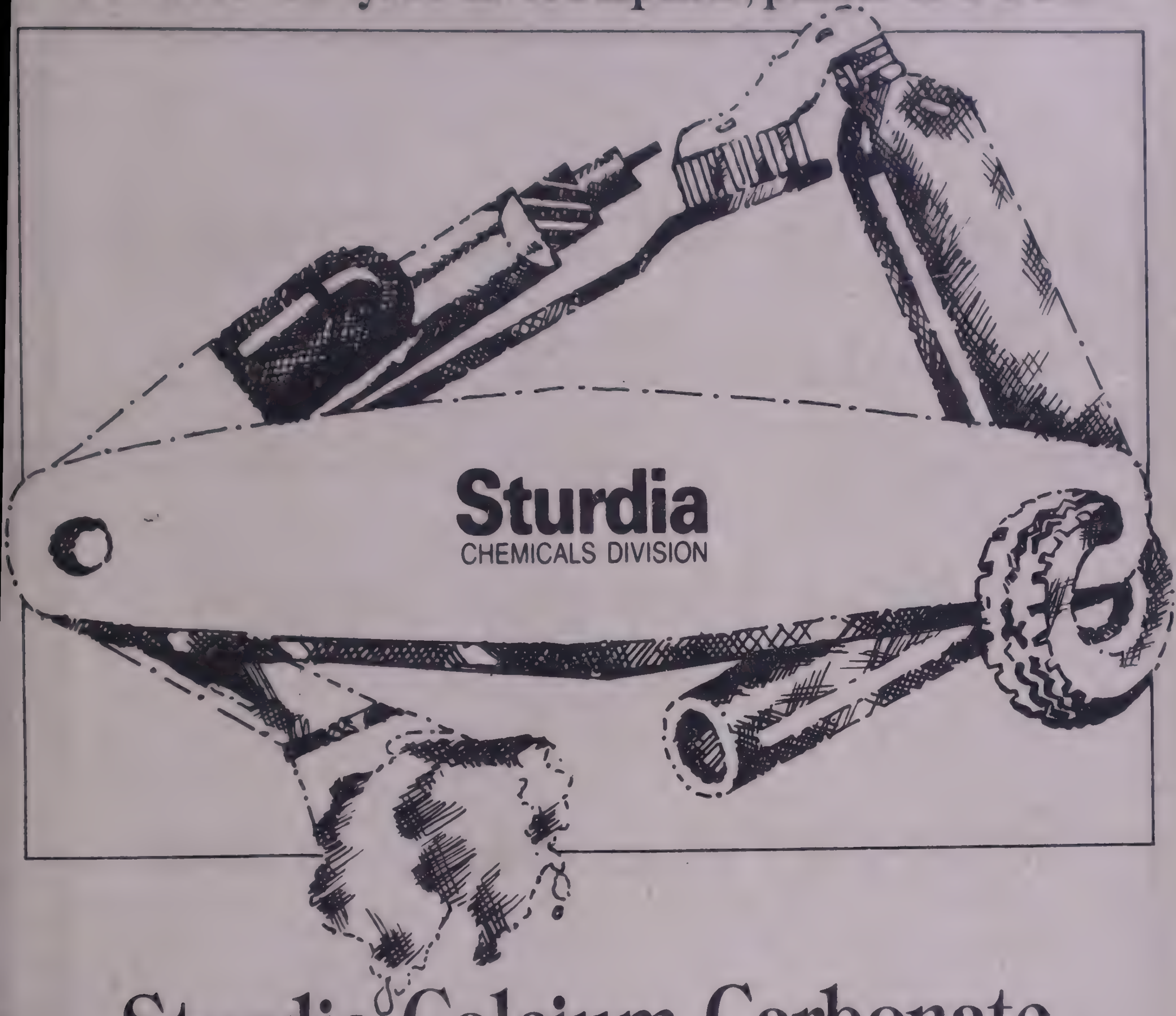

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CHEMICAL
WEEKLY

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Self Sufficiency in Oil Seeds Production -- A Mirage?

he imperative need to achieve self sufficiency in oil d production in an expeditious and cost effective nner has been stressed by all and sundry for the past decades and perhaps even earlier. That a predom- ntly agricultural country like India should be required mport, year after year, large quantities of vegetable is a sad commentary on the Indian planners, if not farmer.

During the two year period (November 1983 to Octo- r 1985) the State Trading Corporating of India borted over Rs. 2,400 crores worth of edible oil. When s realised that the annual per capita consumption of s and fats in India is only 4.6 kg. as against a world erage of 7 kg. and of 26 kg. in developed countries, e extent of leeway to be made in oil seed production ly be better appreciated.

nclusion of oil seeds in the Twenty point programme the Sixth Plan and the appointment of the Oil Seed rust Mission during the Seventh Plan are a measure the Governments concern about the growing imbal- ce between supply and demand of vegetable oils.

The rise in oil seed production from 90 to 130 lakh nes in the Sixth Plan did generate a great deal of timism and the oil trade clamoured for an increase m 6.5 to 10% in the growth rate in the Seventh Plan.

The mid term review of the Seventh Plan, however, ain displays the most dismal situation in this field. eather Gods have played truant in the oil seed pro- cing regions, in some cases for an unprecedented ee seasons in succession. Oil seed production in the t three years of the Seventh Plan not only shows any rease but is 10/20 percent below the base year output 130 lakh tonnes.

During the ten year period 1975-76 to 1985-86 the area under oil seeds cultivation went up by about 2 million hectares. The overall yield per hectare stagnated around 600 to 650 kgs. per hectare as against an international figure of 800 to 1500 kgs. for dry farming and 2000 to 2500 kgs. for irrigated areas.

The Seventh Five Year Plan document has drawn attention to a number of encouraging features in this scenario. First is the diversification in oil seed crops. The area under Sunflower has increased five fold during the Sixth Plan period. It is spreading rapidly in Karnataka and Maharashtra and to a less extent in Madhya Pradesh and Gujarat. Sunflower is drought tolerant and the farmers find it a low risk crop under low rain fed conditions.

The area under Soyabean is increasing fast in Madhya Pradesh as also in some districts of Maharashtra bordering on Madhya Pradesh. Besides summer groundnut is becoming popular in many States. These confirm the assumption by the planner that given a low risk environment, which is dictated by crop variety and agroclimatic factors, farmers do take up oil seed cultivation and apply cash inputs.

Oil seed cultivation continues to depend overwhelmingly on uncertain rainfall. Oil seeds occupy 11% of the total cultivated area but only 3% of the total irrigated area is under oil seeds, that too under minor irrigation which again depends on rains. Whenever irrigation has reached oil seed areas farmers shift to rice, cotton, sugarcane and in winter, wheat. This shows that oil seed technology suitable to irrigated areas is not remunerative as other crops. Efforts to popularise irrigated summer ground nut or pure mustard crops since the beginning of the Fourth Plan have met with little success. Oil seed growers facing high risk of crop failure are reluctant to invest in optimum seeds, fertilisers, pest control which help to improve yield.

Farmers are not inclined to take up oil seed cultivation in new areas where the local trader is unfamiliar with the seed since they have no market support. This is the reason why cultivation of Safflower as a second crop in mono crop areas like Rajasthan, Madhya Pradesh and Soyabean in Gujarat, Bihar etc. have failed to establish.

According to the present indication, the gap between demand and supply of edible oil will continue to persist. To achieve a target of 18 million tons by the end of the Seventh Plan, our planners had suggested a two field strategy, namely production increase through measures of inter cropping, sequence cropping and relay cropping.

Technology is at the core of agricultural development. If improved technology makes additional demands on scarce resources -- e.g. irrigation and fertiliser, it will have to demonstrate that a shift in the use of these imports in favour of oil seed will be in the overall interests of agricultural production and national economy in general.

Secondly it is not enough to expand oil seeds production -- the improved technology should be cost effective. The growth potential of each oil seed crop should be evaluated and the region best suited for its growth identified.

If the net sown area under oil seeds cultivation is to be expanded, it would be necessary to identify the crop for which the cultivated area will be diverted to the oil seed crop. This will be possible only when the profitabilities -- taking into consideration the risk and uncertainty of the particular oil seed crop relative to the profitability of the displaced crop is established. This economic aspect should be thoroughly investigated by competent agencies for different regions.

The same applies to the extension of the existing or new irrigated areas to oil seeds cultivation. Farmers will apply irrigation to that crop which he believes, will give him the highest return. He will not apply it to an oil seed crop simply because he is told that the country needs more oil seed or that imports of oil seed are causing heavy drain of scarce foreign exchange resources.

Apart from the demand and supply factors, the relative profitabilities of an oil seed crop in comparision with any other crop will depend on (a) yield per hectare, (b) the oil content (c) the value of the bye-product oil cake. Different oil seed crops have different plus and minus points in regard to these parameters. It may not always be possible to arrive at the most cost effective option for simulating oil seeds production.

The major technological factors to be implemented t achieve accelerated growth rate have been the subjec of many and detailed studies. Given below are some o the points highlighted by Dr. K.N.G. Menon in September 1984 at a symposium on "Oil Seed Productio and Utilisation: Constraints and Opportunities":

1. i) Increase aea under oil seeds by intercroppin (cotton with groundnuts, soyabean, sunflowe linseed; maize with soyabean; sugarcane wit soyabean/mustard; potato with mustard.
   ii) For greater yield of Rice Bran oil, encourag shifting of rice milling from hullers to shellers
   iii) Modernise and improve hullers to produce bra containing more oil and less silica.
   iv) Encourage low cost stabilisers to inhibit lipase
   v) Encourage solvent extraction of ground nut an mustard oil cakes.
   vi) Optimise fatty matter in soaps without losin performance to reduce consumption of fats.
   vii) Better use of non edible oil for new and usefu petrochemicals.
   viii) Permit new technologies such as interesterif cation in the vanaspathi industry to improv product quality and nutritive value.
2. Produce single cell oil by genetic manipulation an fermentation.

To sum up, with oil seed farmers debilitated by lon periods of drought and State infrastructure of input deli ery system and of extension not geared to the task, th hope of achieving 6.5% growth rate in the current Pla has almost disappeared.

Prospects for accelerated oil seed growth rate are st rated as good in medium and long term, if Governme policies are oriented to bring larger proportion of irrigate land under oil seeds, encourage rapidly the seed indu try to make hybrids and make high yielding seeds ava able, assure price and market support to growers an protect farmers' full investment through comprehensi crop insurance. Such a policy support and a more acti extension machinery can ensure rapid acceptance of th available machinery to improve yields as well increase oil seed output, through inter/mixed an sequential cropping.

(Summarised from the Background and other papers presented at seminar on "Achieving Self Sufficiency in Oil Seeds Production" or nised by the IMC Economic Research & Training Founder, Augu 1987)

--T.P.S. RAJA

HEMARENA

. VENKITESWARAN

Biotechnology business

ow big is the biotechnology business and what are major items? We hear so much of the new era of ech products but in terms of quantity, ethyl alcohol nd will continue as the unapproachable number one. s is a traditional product boosted today by fuel grade anol to over 6 million tons world-wide. It accounts for % of world sales of biotechnology products which is imated now at $15.5 billion. 90% of all carbohydrate dstocks (which includes sugar) processed by fer- ntation end up as ethyl alcohol. These are the data m a new book "Economic Aspects of Biotechnology" Andrew. J. Hacking, Cambridge University Press.

uels derived from biomass are still a long way off cept for the ethyl alcohol. But one forgets that bio- ss in the form of fuel wood is one which is widely used enormous quantities and with serious dangers of orestation to levels which may soon be irreversible. e quantity of fuel grade ethanol is insignificant in com- rison to the direct fuel usage of biomass by direct mbustion including the large quantity of cowdung kes used in India. In the case of the convenient eth- ol liquid fuel the feedstock cycle has changed from lasses to ethylene from petro sources and now back corn and sugarcane. The ascent (or descent?) to celluloses is on the distant horizon. But meanwhile use of corn for ethanol and High Fructose Corn Syrup (through use of enzymes) together constitute the largest section of the biotech industry today. Substrate cost vis-a-vis new lower cost conversion methods of cellulose cannot be readily predicted. The great advantage of ethyl alcohol as with some of the other biotech products like organic acids, and solvents is that recovery of products is simpler and less costly than for the new biotech products. Ethanol fuels are supported by direct and indirect subsidies wherever used at present, but subsidies will become unnecessary when crude oil prices soar to $40 and above per barrel. Today 90% of the world's fermentable carbohydrates generate a third of biotechnology sales when we add antibiotics enzymes, organic acids and amino acids. The new biotechnology and its products through recombinant DNA has a longway to go towards the billion dollar business area. But Mr. Hacking estimates $2.5 billion as the investment by end of 1983 and research expenditure at $6.7 bill. worldwide now. Some items have hit the headlines --human insulins, lymphokines, growth hormones, rennin, monoclonal diagnostic agents, enzymes, microbial pesticides. Many more are in the background and may swell biotech business to between $40 to 60 billion by 2000 AD.

Improved grades of Synthetic Fibres

he sixties and seventies saw the emergence and minance of the pure synthetic fibres after the earlier of rayons. Nylon or polyamide to use the generic n, had an early start until the polyester overtook it er the filament yarn type was added to the earlier ple fibre. Acrylic fibres had a start in the shadow of ol and a cheaper process for the base chemical -- ylonitrile -- and various improved types have helped get it a sizeable share of the market. Polyolefine in form of polypropylene has a limited usage and the yons constitute the last of the five major man made es which share the market. The competition between m has been limited until recently when special variations for specific usage areas have reignited competition as per brief review in *Chemical Business* of September 1987. In between, a fibre like vinylon based on vinyl acetate has remained static and confined to Japan and recently China. Numerous problems with these fibres like dyeability, feel, moisture absorption washing characteristics, blends with cotton and finishing have been met successfully.

Carpet fibres is one of the larger segments where recent improvements are said to be outstanding. Nylon fibres have the lion's share of this market and polypropylene has been creeping in. The most difficult problems carpets relate to the removal of stains, (or non-staining characteristic) durability, fire resistance and of course cost. It is here that certain improvements have been made with DuPont introducing "Stainmaster" fibre and chemical system, Allied Signal their "Anso V Worry Free" nylon carpet fibres and Monsanto their own "Gold Label" nylon carpet antistain systems. These new generation fibres claim new methods of imparting antistain properties -- either before spinning or afterwards. These are backed up by modifications of formulations and special claims on stain repellant characteristics. Most important is the wearability for some years of use and to vacuum cleaning. DuPont is the leader though the other two are not far behind.

Polyester has improved its appeal to the carpet maker through better and wider range of dyes and Hoechst's line of Trevira multicoloured polyester carpets and superimposed colours to get attractive designs in scroll, high and low loops etc. Ultraviolet fade-resistance is also improved and these new range of fibres are also good for apparel. DuPont are also a leader in polyester and have special polyester (Decron) fibres for sports wear -- their "thermax" hollow fibres and "coolmax" fibres which keep the body cool. Polyester fibre is one where many variations and modifications are possible for specific uses and designs.

While nylon and polyester are the main fibres for apparel, polypropylene of Hercules is said to be preferred for skiclothing, jogging, underwears, sports sock and general outdoor wear, as also home furnishings Polypropylene is said to function well in sportswear du to its "wicking" action drawing away moisture from th skin. Acrylics have been improved for longer wear i socks and knitted wear. In the case of cellulosics th major interest is in high wet modulus and rayon ofte comes to the forefront with changes of fashion. Rayo has generally better luster but not the life of the pur synthetics. BASF claims to have high ultra wet-modulu fibres for clothing and furnishings. The other main producer, Courtaulds of U.K. expects to introduce soon new cellulosic fibre which they code-name "Genesis' This is made from chemical pulp by a different proces which is not an acid process. This new fibre is claime to be even stronger than high wet modulus rayon bu commercial scale production and sales have to b awaited. Rayon's use in tire-cord has nearly vanishe but other areas continue and acetate rayon is still a larg volume fibre in USA.

Non-woven material is gaining wider areas of usage more so in the medical field and here rayon along wit polypropylene and polyester are preferred. Even for th new superabsorbent material of diapers, polypropylen fibre is preferred for the cover stock. Improvements fo sales promotion and leverage are being made in th major synthetics but as with plastics there is no ne class which is likely to emerge for general us

More use of PET and PBT Resins

A recent write-up in *Chemical Week* shows a big jump in the use of thermoplastic polyester resins -- PET and PBT. The blending of polyester with polycarbonate containing 30 to 60% of polyester has helped penetration into more auto components, particularly bumpers. PBT - Polybutylene Terephthalate, is expected to have a market for over 10 million lbs in such blends. "Pocan" is a product of Mobay Chemicals and "Xenoy" is an alloy with PBT of GE. Pallets for material handling using PC/PBT bends is a new area. PET of Eastman Kodak has entered more into food and beverage packagings. Single-serve bottles in airlines is being taken over by PET. PBT is being introduced for tooth brushes as a top layer over polyethylene. PET containers for soft drinks of all types, peanut butter, salad dressings etc. hav made greater inroads. A new grade of "cleartuf" PE is marketed by Goodyear. The big new area is for "over able" trays which can be used in microwave ovens fo trays which are marketed with a ceramic like finish.

Clear polyethylene terephthalate, CPET, trays for us in ovens are now expected to touch 400 million lbs soo while containers would touch 6 billion units.

Blends are said to be the area of maximum grow in the coming years. It is regretted that India is yet make a start in the production of resin grades of PE to provide the impetus for growth.

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Alcohol price hike : distilleries, users in a fix

The Government's decision to fix industrial alcohol price at Rs. 2.64 per litre has created a piquant situation for distilleries and has squashed the hopes of the alcohol starved chemical industry which looked forward to improved availability of the material.

The scenario, characterised by vast differences in prices in various States and barriers of 'export pass fees'' set up by States which has choked inter-State movement of the commodity, has become murkier following the Government's announcement.

Distilleries in Maharashtra, where the ruling price is Rs. 3 per litre, are thinking of raising the price by 35 paise, though no final decision has been taken. It is yet to be seen how distilleries in other States would respond. The prevailing prices in Uttar Pradesh, Gujarat, Karnataka and Tamil Nadu are Rs. 1.80, Rs. 3, Rs. 5 and Rs. 2.75, respectively.

The Government order of September 29, amending the Ethyl Alcohol (Price Control) Order of 1971, has fixed the price of rectified spirit conforming to ISI Standard No. 323-159, 94.68 per cent v/v strength, at Rs. 1,898 per kilo litre (Rs. 1.90 per litre).

In addition, the Government has allowed 44 paise per litre as molasses transportation charges and 30 paise as fuel adjustment charges. The total price thus works out to Rs. 1.90 + 0.44 + 00.3 = Rs. 2.64 per litre.

When distilleries in the three surplus States of Uttar Pradesh, Maharashtra and Tamil Nadu find it difficult to sell their stocks at the prevailing prices, it remains to be seen whether they will gain by raising the price, unless the concerned States agree to slash the export pass fees.

Sources in alcohol-based chemical industry expressed their unhappiness with the Government's decision to raise the price when the Government is reportedly considering reduction in the prices of other basic feedstocks like naphtha and methanol.

Meanwhile, sources in the State Trading Corporation (STC) confirmed that despite disclaimers to the contrary, export of alcohol is still under the active consideration of the Government. STC had sounded potential buyers in the US, Japan and Europe and is awaiting further instructions from the Government.

This year's drought, it is feared, may affect the sugarcane crop of 1988-89 season. If the Government decides on hasty exports in view of the current surplus, it may have to import the material as happened in 1985, industry sources said.

In view of the conflicting reports on the Government order on alcohol pricing, the full text is reproduced below:

S.U.871(E) : In exercise of the powers conferred by Section 18-G of the Industrial Development and Regulation Act, 1951 (65 of 1951) the Cenral Government hereby makes the following order to amend the Ethyl Alcohol (Price Control) Order 1971, namely : —

(1) This order may be called the Ethyl Alcohol (Price Control) Amendment Order, 1987.

(2) It shall come into force on the 1st day of October, 1987.

2. In the Ethyl Alcohol (Price Control) Order, 1971 (hereinafter referred to as the said order), in Clause 2 — (i) in sub-Clause (1), for the existing Table and Note the following table shall be substituted, namely :

TABLE

1.	Absolute alcohol conforming to to ISI Standard No. 321-1952, naked, for equivalent volume at 100 per cent v/v strength.	Rs. 2,204 only per kilo litre.
2.	Rectified spirit conforming to ISI Standard No. 323-1959, naked, for equivalent volume at 100 per cent v/v strength.	Rs. 2,204 only per kilo litre.
3.	Rectified Spirit conforming to ISI Standard No. 323-1959, naked, for equivalent volume at 94.68 per cent v/v strength.	Rs. 1,898 only per kilo litre.

ii) for sub-Clause (2) the following sub-Clause shall be substituted, namely :

(2) The pricas specified in column (2) of the Table below sub-Clause (1) have been fixed taking into account.

(a) Sugar factory molasses Grade-I, being Rs. 120 per tonne.

(b) Sugar factory molasses Grade-II, being Rs. 96 per tonne.

(c) Sugar factory molasses Grade-III, being Rs. 72 per tonne.

(d) Khandsari molasses Grade K-I, being Rs. 180 per tonne.

(e) Khandsari molasses Grade K-II, being Rs. 150 per tonne.

(f) Khandsari molasses Grade K-III, being Rs. 120 per tonne.

(g) Khandsari molasses Grade K-IV, being Rs. 96 per tonne.

(h) Khandsari molasses Grade being Rs. 72 per tonne.

iii) in sub-clause (3), after the Explanation, the following sub-Clause shall be inserted, namely :-

(4) The prices as in Column (2) of the Table below sub-Clause (1) shall not apply to the alcohol produced from raw materials other than molasses.''

3. In Clause 3 of the said Order, for sub-Clause (a), the following sub-Clause shall be substituted, namely:

(a)(i) A sum not exceeding Rs. 114 per k.l. for the units attached to sugar factories and Rs. 444 per k.l. for the units independent of sugar factories, based on actual average cost incurred for the transport of molasses to the distillery in relation to the previous year.

(ii) Where distillery has been spafically permitted by the State Government to use furnace oil, exclusively an additional amount of Rs. 300 per k.l. of alcohol shall be recoverable by the concerned distillery. This facility will, however, be available only for a maximum period of five years and not thereafter.

(iii) Actual expenditure on incidental charges on octroi duty, sales tax, administrative charges, movement fee, licence fee or any other similar levy paid or payable on molasses shall be recoverable.

(iv) Salaries and allowances of State Government excise staff wherever borne by the distillery shall be added pro-rata to the ex-works prices as revised above.

(v) An amount of Rs. 150 per kilo litre will be allowed for anaerobic treatment through reactors. If the distillery adopts in addition to anaerobic treatment facilities through reactors, aerobic treatment in lagoons before discharge, a further amount of Rs. 100 per kilo litre will be allowed to such distilleries.

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Two share physics nobel prize

Dr. George Bednorz of West Germany and Dr. K. Alex Mueller of Switzerland won the Nobel Prize in Physics on Oct. 14 for their discovery of new superconducting materials.

Both are researchers at the IBM Zurich Research Laboratory in Switzerland. The announcement by the Royal Swedish Academy of Sciences cited "their important breakthrough in the discovery of superconductivity in ceramic materials."

Last year, Dr. Bednorz and Dr. Mueller had reported finding superconductivity in an oxide material at a temperature 12°C higher than previously known, the announcement said.

Last year two West Germans, Dr. Ernst Ruska and Dr. Gerd Binnig, and a Swiss, Dr. Heinrich Rohrer, shared the Physics Prize. Dr. Ruska won for work in electron optics and the design of the first electron microscope — Dr. Binnig and Dr. Rohrer designed the scanning tunneling microscope.

Previous winners of the Physics Prize have included people who became famous beyond the science world, like Wilhelm Conrad Roentgen, who won in 1901 for work on X-ray technology, and Gugliemo Marconi, who received the award in 1909 and was credited with inventing the radio.

Each Nobel Prize carries a cash prize of 2,175,000 Swedish kroner, or about $340,000, which is divided if more than one person is named for each prize.

The announcement said the work of Dr. Bednorz and Dr. Mueller last year led to better superconductors being produced in hundreds of laboratories around the world.

The work of Dr. Bednorz (37) and Dr. Mueller (60) could eventually help shape ultra-powerful and ultra-fast computers, among other possible applications, said Mr. Erik Karlsson of the awards committee.

Chemistry prize for three :

Dr. Donald J. Cram and Dr. Charles J. Pedersen of the United States shared the Nobel Prize in chemistry on Oct. 14 with French Researcher Jean-Marie Lehn for their work in the

theses of molecules that can mimic important biological processes.

The Swedish Academy of Sciences cited their work in making relatively uncomplicated compounds that perform the same functions as natural proteins.

"Great progress towards this goal has been made over the last 20 years, and it is the pioneering achievements in this particular area that are now being recognised," the announcement by the awards committee said.

DIRECT IMPORT OF DMT

Users asked to apply

The Union government is now understood to have decided to allow imports of DMT by actual users directly. Individual units manufacturing polyester staple fibre and filament yarn have been asked to submit their requirements to the director general of technical development (DGTD), it is learnt.

The decision has been taken after taking in to consideration the availability of indigenous DMT supplies and the increasing requirements of the consuming industry. Already two consuming plants have closed down since more than a month and most others are working only partially, according to informed sources in Bombay.

The industry has been asking the authorities since February this year to allow DMT imports to meet the shortfall in the supply from indigenous manufacturers. The shortfall has already resulted in huge production losses in addition to loss of revenue to the exchequer. The shortage has forced some plants to down their shutters: others have had to restrict their production despite huge installed capacities. The time has come when neither the DMT producers nor the consumer in the country has any comfortable stocks to meet even regular requirements, the sources said.

The delayed decision to allow imports of DMT has forced consumers to eat into the stocks and the situation has come to such a stage where more units might be forced to resort to restricting their PSF and PFY productions until the actual import of this raw material. Considering the past experience with the licencing authorities for the import of caprolactam, the whole process is expected to take another three months unless the autho-

subject to the approval of a monitoring agency, the sources added.

Considering the average availability of 10,000 tonnes of DMT per month from indigenous manufacturers, the government should immediately allow imports of at least 30,000 tonnes of DMT under OGL, of which 15,000 tonnes would be needed to meet the shortfall in supply and 15,000 tonnes for necessary inventories with consumers, they said. "Due to likely shortfall in PSF and PFY production alone, the government is estimated to lose around Rs. 60 crores revenue until December-end and this is expected to go up to Rs. 100 crores till end-February 1988," the sources claimed.

The situation has arisen because of continuous increase in the production of PSF and PFY during the past few years, whilte the availability of DMT has not kept pace with them. The PSF production during 1985-86 was 42,827 tonnes which increased by 12 per cent at 47,859 tonnes during 1986-87 and registered a further growth of 34 per cent at 26,804 tonnes during April-August 1987.

Considering the monthly average of 5361 tonnes of PSF and 6245 tonnes of PFY during April-August 1987, the annual production of both these products is estimated around 65,000 tonnes and 75,000 tonnes respectively, bringing the total prdouction to 1.40 lakh tonnes. The production at this rate, without taking into consideration the growth aspect, will require at least 1.50 lakh tonnes of DMT. With additional DMT consumption of 30,000 tonnes by film, plastics and other industries, the total DMT requirement until March 1988 would go up to 1.80 lakh tonnes against estimated indigenous

AM INDUSTRIAL POLICY

Priority for small and gas-based units

Assam government is all set to
new direction to its industriali-
programme by giving top prio-
the gas based industries and
scale ventures by the educated
ployed in the state, according to
Prafulla Kumar Mahanta, chief
ter.

estimated three million cubic
es of gas is being flared in As-
rich oil and gas bearing areas
This entire gas could be utilis-
vith the setting up of giant gas
ker plant in upper Assam.

lking to a team of visiting news-
at Guwahati, he said that the to-
estimated investment on this pro-
would be Rs. 1,100 crores. A fea-
ity study on the project was al-
y conducted by Engineers India
and it is rated as a viable project.

he lean gas which is rich in Me-
could be utilised by the existing
well as new projects for fertiliser
uction, power generation and as
for hundreds of tea gardens. The
plex is expected to be completed
ree years.

he commissioning of the complex
ld, in turn, help set up a number
lownstream plants for the manu-
ure of several plastic items.

r. Mahanta said that a shift in the
strial policy of the state has be-
essential now as the plywood in-
ry, the dominant industry of the
, has reached a saturation point.
e are 23 plywood units operating
e state now and its growth is
icted with the ban on cutting of
in the state.

e chief minister said that the
government has undertaken an
strial potential survery of all the
icts to identify the possible indu-
units which could come up in
districts.

e state government has simultane-
launched a scheme of identifying
ntial small entrepreneurs amongst
educated un-employed. It is propo-
to have a system of matching of
preneurs with the possible industries considering the skill and background of the entrepreneurs.

The products manufactured by these entrepreneurs under the scheme would be marketed by the Assam Industrial Development Corporation. Marketing is one of the major problems the small entrepreneurs are facing in Assam to-day.

The government thinks nearly 3500 small scale units would be established in 1987-88 in the state. A target of establishing 1500 handicrafts units has also been fixed for the current year. These projects alone are expected to create an additional employment for 30,000 people.

Mr. Mahanta said that perhaps the two serious handicaps that come in the way of industrial development of the state is inadequacy of private investments and lack of transport and communication network in the state.

There is virtually no flow of capital to Assam from outside the state. Growth of fresh private investment inside the state is also considered marginal as the generation of capital is restricted because of the backwardness of the state.

The state government is therefore of the view that nationalised commercial banks should frame a liberalised package of financing the state industries. The banks should not insist on normal debt equity ratios when financing industrial units in the state.

The chief minister was of the view that the small scale units banks should adopt a ratio of 1:2.5 and for the medium scale units it should be 1:1.75.

He complained that the Centre was neglecting Assam despite the state's substantial contribution to the national exchequer and employment. The state produces almost 50 per cent of the total tea production and this industry also provides employment to three million people.

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BPCL admits to oil leakage

Bharat Petroleum Corporation Ltd (BPCL) admitted that 450 tonnes of imported base oil, used for the production of lubricating oils, had leaked from a two-km-long pipeline connecting the jetty end of Indira Dock to its Wadi Bunder blending plant.

The BPCL general manager, Mr. R. K. Batra, said that the oil had been found in the sewer running alongside Mallet Road, adjoining the Mallet Road installation, and the Mazgaon municipal sewerage pumping station. He, however, denied that there was any "connection, at the moment," between this leak and the pollution of the Bombay harbour on September 27.

Bombay Port Trust (BPT) authorities said that it was not coincidental that both the leak and the oil spill occurred on September 26/27.

The BPCL has not, to date, informed the BPT about the quantum of the leak, it was learnt. On September 30, following the BPT's investigation into the oil slick, the BPCL pipelines manager informed the BPT pollution control cell's director, Capt. J. S. Lamba, that the pipeline had developed a leak and that oil was found in the drains off Mallet Road.

The port authorities had by then deduced that since the slick was coming from the north it must have originated from one of the oil refineries.

Oil industry sources said, that the base oils (Bright stocks) had come from Singapore abroad a tanker, "Nand Smriti," which docked at the jetty end of Indira Dock on September 2[illegible]. About 1,450 tonnes of the oil was discharged through the "tanker discharge pipeline for base oils" to the BPCL's Wadi Bunder blending plant.

When the discharge and receipt figures were compared, the BPCL's receiving station found that it was short by 450 tonnes, the sources said. Also, a "pig ball", passed through the pipeline from the tanker end to clean the pipeline, did not come out from the other end.

The next day (Sunday), officers from the Indian Oil Corporation (IOC), which is the canalising agency for all oil imports, and the BPCL went on board "Nand smriti" to check whether all the oil had been drained into the pipeline. The tanker was found to be empty.

On September 28, the two oil companies alerted the Bombay municipal corporation's (BMC) sewerage department, because the oil had been detected in a manhole at Mallet Road and the Mazgaon pumping station.

Thirteen days after the leak, the BPCL surveyed the Bombay harbour area, including the Dry Dock, Princess Dock, Victoria Dock and the Worli sewage outfall (the sewage from the Mazgaon pumping station flows to Worli), and detected no oil slick, Mr. Batra said. The exercise was repeated today, with the same result.

BPT authorities, who refused to be quoted, said that by then the oil slicks had been washed away by the tide.

Mr. Batra said that the BPCL had begun digging up the area on Mallet Road to plug the leak in the underground pipeline, which has been nonfunctional since September 27. The pipeline was laid prior to 1953, when the Wadi Bunder installation came up, he said.

There had been leaks in the past, but none of this magnitude, Mr. Batra said. The BPCL has scooped up an undisclosed amount of oil and sludge for recovery of the oil, which is being attempted for the first time, he added.

The BPT has collected another 50 tonnes of oil and sludge, and the Maharashtra Pollution Control Board (MPCB) is expected to collect samples shortly.

The BPCL has asked its deputy general manager, Mr. Jogdish Singh, to inquire into the leak, it was learnt.

ASSAM ASKED TO GIVE MORE AREAS FOR OIL PROBE

The Centre has asked the Assam Government to give additional areas covering about 15,000 sq. km. to the Oil India and the Oil and Natural Gas Commission (ONGC) for oil exploration.

The requests for grant of petroleum exploration licences for five areas each by Oil India and ONGC have been pending with the State Government for quite some time, according to official sources.

The State Government has so far not granted further petroleum exploration licences as the Centre has not accepted Assam's demand of "first right" over the use of natural gas and crude oil and preferential pricing for natural gas.

It is feared that drilling rigs of Oil India may remain idle because of lack of drilling sites in Assam. Therefore, it is necessary that the State Government grant additional areas for oil exploration.

At present, Oil India holds only about 2,500 sq. kms of mining and petroleum exploration licence in Assam and Arunachal Pradesh. The company's current oil fields in Assam are ageing and it has not been able to find any large oilfield after the discovery of Moran in 1960. Jorajan oilfield which was to make up for the decline in oil production from Naharkatiya and Moran has not been able to do so.

After the nationalisation of Oil India in 1977 the Government of India encouraged the company to take up oil exploration outside Assam to give the company an all-India character. The company was granted exploration licences in Orissa on land and offshore, Rajasthan and Andamans offshore. Oil India now holds about 60,000 sq. kms. of petroleum exploration licence outside Assam. The company has invested about Rs. 250 crores in oil exploration ventures outside Assam.

The company's corporate plan approved by the Board of Directors indicates that it will become unviable by 2005 A.D., unless it starts producing hydrocarbons from its concessions outside Assam.

After a long toil and large investments, Oil India's efforts in Orissa offshore appears to be bearing fruit. At least three of the 11 wells drilled so far have shown good indications of hydrocarbon prospects.

It is only a matter of time that "Oil India strikes it rich in the Bay of Bengal", according to company sources. Similarly, the company's Rajasthan surveys have shown extremely "good prospects" of hydrocarbons.

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DRUGS EXPORT TO EGYPT :

STC Gomcom sign MoU

The State Trading Corporation (STC) is firming up contracts with Egyptian-government undertaking Gomcom for the export of bulk drugs and chemicals worth $3 million, under a memorandum of understanding (MoU) signed in New Delhi on Oct. 14 between the two state-owned companies.

Under the MoU, Gomcom (El Gomhouria Company for trading pharmaceuticals, chemicals and medicals appliances of Egypt) will treat STC as its single point of contact in India for meeting its requirements of bulk drugs, pharmaceuticals (both for human and veterinary applications), fine chemicals, medical appliances and laboratory reagents.

The 3-million-dollar firming up of supply contract is stated to be an initial exercise. The scope of exports is expected to be enlarged considerably over a period. The validity of the MoU is two years.

It was signed by Dr. T. Prakash, executive director of STC, and Mr. Fouad Abbas said, chairman of Gomcom.

Egypt is importing bulk drugs, chemicals, pharmaceuticals of nearly Rs. 80 crores a year from different sources. Through the efforts of the 2 sides, India's share is expected to increase in the coming years.

STC, in fact, had organised an exclusive exhibition of pharmaceuticals in that country in October, 1986, to show the capabilities developed by India. That exhibition had attracted Egyptian buyers, according to STC.

STC will, on a selective basis, enlist manufacturers and exporters keeping in view good manufacturing practices, strict quality control and experience in the field and forward samples along with test reports for evaluation and acceptance, apart from submitting offers against tenders from the Egyptian company.

Another highlight of the MoU is that Gomcom would try to maximise imports from STC, which, on its part, will ensure supplies at internationally competitive prices.

Gomcom will advise STC in advance of its annual and emergent purchases plan for all items imported by Gomcom and other organisations to enable STC to submit samples for approval and to plan participation in tenders and enquiries.

Moreover, the Egyptian company will extend assistance for all promotional activities in that country.

STC will give a commission to Gomcom for it services linked to for value in the currency of payment on realisation of the value of the merchandise. This commission will be three per cent for bulk drugs, pharmaceuticals, veterinary medicines and laboratory reagents.

SUPERCOMPUTER USE ONLY FOR RESEARCH

There will be restriction of access to and monitoring of the use of the supercomputer recently purchased by India from the US, according to Dr. John D. Stempel, American consul general in south India.

Speaking to newsmen in Bangalore on Oct. 14 he said that restrictive stipulations in the agreement signed between the two countries would pertain to certain kinds of nuclear research only. The agreement he said had been signed in good faith between the two 'friendly countries'. Allaying speculation, he said Cray Computers Ltd., was still manufacturing the super-computers despite changes in its top personnel and the 100 supercomputers already sold were being serviced by the company.

Dr. John Stempel felt that the supercomputer deal was a landmark agreement between the US and India and for the first time the supercomputer was being sold to a country outside the US's defence pacts.

Announcing the opening of 'Electronics USA '87,' an exhibition of professional electronics and communication equipment on October 15, he said that over 35 US companies were expected to participate in the exhibition and $8 million worth of equipment would be displayed.

ALCOHOL FROM BEETROOT MOLASSES

Ganganagar Sugar Ltd., a Government of Rajasthan undertaking, has developed a new technique of manufacturing alcohol from beetroot molasses in what is claimed to be the first ever process to be adopted in the world by a sugar mill.

The technique which has yielde about 4000 litres of spirit during th current financial year has been developed jointly by scientists at the National Sugar Institute, CDRI, Lucknow CFTRI, Bangalore and the Haryan Agriculture University, Hissar. Research is under way to manufacture an blend (foreign) liquor with the spir manufactured from beetroot molasses the chief executive officer of the firm Mr. Ashutosh Bhargava, said.

According to Mr. Bhargava, th Centre has lifted the ban and restrictions imposed on modernisation, development and extension of industrie engaged in this trade and the firm wa planning to expand its Ganganagar un to manufacture one crore litres c liquor (foreign and country) annually.

CAPROLACTAM PLANT TO BE SET UP IN BOKARO

The Steel Authority of India Ltd Shri Ram Fibres and Bihar State Industries Development Corporation signe a memorandum of understanding fo setting up 50,000 TPA caprolacta plant at Bokaro.

A separate, full petrochemical con plex will come up at Barauni, a Bih Government release said in New Delh

The MoU was signed by Mr. Arvin Pandey, Director, Corporate Plannin SAIL, Mr. Arun Bharat Ram, Managin Director, Shri Ram Fibres and Mr. V. Sharan, Chairman and Managin Director, BSIDC.

The Rs. 300-crore project, is base on the benzene and ammonia to b made available by SAIL and would r sult in the production of 50,000 to nes of caprolactam and 90,000 tonn of ammonium sulphate.

KERALA MAY GET AMMONIA PLANT

The Union industries minister, M J. Vengala Rao, has assured the Ker la government that its demand for se ting up ammonia-urea plant in t Udyogamandal area of Ernakulam di trict will be considered in the Eig Plan.

The assurance has been given his reply to the chief minister, M E. K. Nayanar's letter, which rais the demand.

Mr. Rao also clarified that the was no proposal under considerati to set up an ammonia-urea plant in T mil Nadu.

New products and processes

ALLER CATALYSING PARTICLES
LD BIGGER PRODUCTS

ndustrial chemistry often relies on
kind of reaction — flowing a
xture of gases over the surface of
solid metallic catalyst. Such reac-
ns are very temperamental; a small
ange in the temperature, pressure or
alyst can have a drastic effect on
kind of products formed. Now a
oup of chemists from Japan and
ina have discovered a distinct trend
one of the factors controlling the
action. The researchers have found
at the products obtained can vary
amatically with the size of the indi-
dual metal particles in the catalyst.

One of the most widely used cata-
sis reactions is the Fischer-Tropsch
ocess, where a mixture of carbon
onoxide and hydrogen gases (com-
only known as synthesis gas) passes
er the metal catalyst to produce hy-
ocarbons. The reaction produces a
ried brew of different sizes of hyd-
carbons from methane and ethane to
the heavier petroleum products, as well as other substances such as alcohols. Most important are the heavier products which can then be used as feedstocks elsewhere or as synthetic fuel. But if the conditions are not exactly right, the reaction tends to produce methane and little else of use. Now, however, Dr. Toshio Okuhara and his colleagues from Tokyo University and the Institute of Molecular Science, Japan, with Dr. Zhang-Zhong Lin from Xiamen University, China, have shown that, with the correct size of catalyst, the formation of methane can be greatly depressed in favour of the larger, more desirable hydrocarbons.

These chemists prepared two different types of ruthenium metal supported on alumina to use as catalysts. The ruthenium metal comes from the compound ruthenium carbonyl. For the first catalyst, the researchers mixed this compound with alumina and used hydrogen to reduce the ruthenium carbonyl to ruthenium metal. They made the second catalyst by oxidising the ruthenium metal in the first catalyst with oxygen and the reducing it again with hydrogen. The two catalysts gave different proportions of the heavier hydrocarbons during hydrogenation of carbon monoxide. With the first catalyst, more than 60 per cent of the products were hydrocarbons containing from two to five carbons. In contrast, in the reaction with the second catalyst, which had been reduced twice, over 80 per cent of the product was methane.

In an attempt to understand the reasons for these differences, Dr. Okuhara and his colleagues investigated the structure of the surfaces of the catalysts. From a combination of the techniques of electron microscopy, X-ray diffraction, and a variation called EXAFS (for extended X-ray adsorption fine structure) the team built up a picture of the two catalysts' surfaces. They turned out to be very different.

In the first useful catalyst, each ruthenium particle on the alumina is about 1 nanometre in diameter (0.000001 millimetre), small enough to fit six similar ruthenium particles around it. In the second catalyst,

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which had been reduced twice, the individual ruthenium particles are 10 times bigger, about 10 nanometers each. So it appears that small metal particles are needed to make bigger hydrocarbons, and, above a certain size, methane production begins to take over.

Another report from Japan shows that this effect is not confined to the Fischer-Tropsch reaction. Dr. Ken-ichi Aika and chemists from the Tokyo Institute of Technology have studied the direct conversion of methane into ethane and ethylene. On the surface of the metal, methyl radicals form, each containing a single carbon. The radicals couple together to make the species with two carbons.

This team prepared a range of metal catalysts on a magnesium oxide support and measured the surface area of the catalyst exposed to methane. They found that there is a definite limit to the amount of metal that the surface of the magnesium oxide can tolerate before its area starts to decrease. The reaction works best using lithium, sodium or potassium, and these metals give the highest surface area on the catalyst.

BIODEGRADABLE PLASTIC BASED ON CARBON DIOXIDE

Mitsui Petrochemical Industries, Japan's top maker of multi-purpose resins, has worked with Air Products and Chemicals Inc., the leading producer of industrial gases, and Arco Chemical Co., a major producer of ethylene and other chemicals, to develop a biodegradable plastic based on carbon dioxide, instead of petrochemicals. The Japanese and American companies hope to bring down production costs to build a pilot plant within two or three years, to have commercial quantities in production in five to six years.

A Mitsui Petrochemicals spokesman said carbon dioxide and ethylene oxide are introduced in equal amounts and combined under heat and high pressure with a a zinc-based catalyst to produce a plastic that will dissolve into a harmless gas when exposed to temperatures above 240°C and is biodegradable. The material can be made transparent and is intended for use in packaging materials and in disposable resins.

EPOXY RESIN SUBSTRATE FOR OPTICAL-MEMORY DISCS

Researchers at Sumitomo Bakelite Co. Ltd. of Japan have developed epoxy resin substrates for optical discs used for data storage in computers. Such optical discs require greater access time than conventional magnetic discs. However, they have many advantages that make them attractive for applications such as document file memories and computer back-up memories. These include higher memory density and capacity, low cost per bit, provision of random access (unlike the sequential search mandatory in magnetic media), and ease of being attached and detached comparable to floppy discs.

Originally, optical disc substrates were made mostly of glass, chiefly because of its reliability. But such discs had several disadvantages, such as high density, and were unsuitable for mass production and were easily damaged. Plastic subsrates are set to change all this. They are lighter, have better cost performance because they can be mass-produced, and are easier to manufacture. A variety of new substances were under development to enhance the reliability of these substrates for computer memory discs.

The scientists at Sumitomo Bakelite have developed sufficiently reliable substrates using an epoxy resin, which is well known for its thermal resistance, its thermosetting properties and desirable optical behaviour. Epoxy resins compare well against glass and other plastics with respect to properties relevant for optical discs. They are stable, and show greater resistance to chemicals and creep and have higher modulus of elasticity. This increases reliability and reduces distortion by centrifugal forces when rotated.

The major problems associated with epoxy resins stems from their being difficult to fabricate. By combining a resin-formulating and precision moulding technique, a volume production scheme has been devised.

BREAKTHROUGH IN WATERPROOFING

A new technological advancement has made an impact over contemporary water-proofing technology. GREENSBORO POLYCHEM PVT. LTD., (210 Defence Colony Flyover, Commercial Complex, New Delhi-110 024), has claimed a success in polymerising tar. One of the valuable properties of POLYDEE 10 Tar Polymer is its ability to transform readily from the liquid state to tough and hard solid. Curing is accomplished at room temperature.

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A. Two liquid components are to be mixed at room temperature and they set into tough and hard mass after 12 to 18 hours. The system does not contain any solvent hence films do not have any evaporation pin holes and give a superior impermeable coating. Various grades are available from very hard to medium soft, soft & finally elastomeric state, which has extensive use as an EXPANSION JOINT FILLER for RCC structures.

B. POLYDEE coating has remarkable resistance to environmental corrosion, ultra violet rays, oxidation, abrasion and good dielectric strength. It is chemically inert and is non-bio-degradable.

C. POLYDEE 10 TAR POLYMER does not melt at elevated temperatures and has a wide range of working temperature i.e. from —5°C to 100°C.

D. POLYDEE it is claimed, has good bond with almost all construction materials and an excellent waterproof coating for terraces, terrace gardens, toilets, sunk floors, chajjas, water/chemical tanks, industrial floors, underground and overhead structures and snow slip coating besides its other innumerable uses. To name a few in electrical and electronic industry as incapsulating and potting compound electrical insulation and corrosion-proof coating, cable jointing compound etc. It can be used for making moulds and patterns as well.

Seven-fold growth in drugs industry vital

A seven-fold growth in the drugs l pharmaceutical industry would be eded in the next decade to meet growing requirements of medicines achieve the national objective of viding health to the entire population. The present production of medies in the country is around Rs. 00 crores annually.

The estimated world market for ugs for 2000 is $270,000 million, of ich $143,600 million is needed by veloped countries and the rest by veloping countries. The drugs mart in developing countries is likely to gister growth of 900 per cent from e level of 1980.

According to a paper presented by e Indian delegation to the recently-ncluded consultation on the pharmautical industry at UNIDO by the cretary, Department of Chemicals d Petrochemicals, Mr. H. K. Khan, was emphasised that there was a emendous scope for the development the industry, particularly in Third orld countries.

The paper said UNIDO, while actg as a nodal point for exchange and ssemination of information technoloy and other aspects of the industry, uld play a vital role.

The technology for a large number drugs was rather closely held and most cases it was with a few deveped countries. UNIDO could play an nportant role in serving as a data ank of technology information. In ost cases, the country importing the chnology lacks information regarding s status and even information about ailability of such a technology.

There was also no institutionalised annel through which such information could be obtained, making it difficult to make the right choice.

The paper further stated that notithstanding the technology problems volved, the Government was making ecial efforts to encourage the production of serums and vaccines with the country.

The export of drugs had gone up rom Rs. 125.3 crores in 1980-81 to bout Rs. 300 crores by the end of 985. However, the import of rugs, mostly in the field of bulk drugs nd drug intermediates, has also shown steady increase during the period, ound Rs. 110 crores in 1980-81 to around Rs. 200 crores by the end of 1985.

DRUG THEFTS : 'PORT OFFICIALS INVOLVED'

A number of senior officials and the security staff of Bombay Port Trust (BPT) are directly connected with a number of dock thefts involving several lakhs of rupees worth of bulk drugs meant for exports, according to Mr. Vinoobhai Shah, President, All India Small Scale Bulk Drug Manufacturers Association.

He alleged in a news conference in Bombay held recently that although the instances of such thefts were brought to the notice of the senior BPT officials including its chairman, BPT authorities showed no interest in nabbing the culprits.

On the contrary, he said, the BPT officials were objecting to the entry of police in the vulnerable areas of Bombay docks where the pharmaceuticals cargoes are kept. BPT has not provided any special warehousing facilities to the pharmaceutical exporters despite several requests.

The most recent instance of drugs pilferage at the docks came to the notice of the exporter only a few days ago. The dock thieves had allegedly tampered with a consignment of 1000 kgs of chloramphenicol and pilfered a large quantity of the drug and replaced it with gum powder, it is stated.

The German company which placed the order with the Indian exporter has now cancelled all the pending orders for the same drug. A few other drug companies in the country had also lost export orders after pilferage started at the Bombay docks on a large scale.

The association has taken up the matter with all the concerned ministries at the Centre.

However no action has been initiated by any of these ministries as yet.

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LARIES AROUND MGCC :

Rs. 7,000 Crs. investment likely

development of downstream and ancillaries around the Rs. crore Maharashtra gas cracker ex (MGCC) will help to catalyse vestment of Rs. 7,000 crores in cinity of Nagothane in district d of Konkan region in the back- of Bombay, according to Mr. V. abhugaonkar, Maharashtra's mi- of state for industry and plan-

r. Prabhugaonkar was inaugurating one-day awareness seminar on industrial opportunities in Maha- ra and management needs of nstream petrochemical and plastic essing industries on account of CC project at Nagothane,' located he west coast, 108 kms towards h of Bombay. The project will be ather in the cap of industrial Ma- shtra. It will give rise to the ge- tion of additional employment of to 3 lakhs in the MGCC complex. project will help to bridge the in development in this economi- lagging region of the state, the ster said.

ddressing the seminar sponsored he government of Maharashtra. In- Petrochemicals Corporation and Development Corporation of an Limited and organised by the arashtra Industrial and Technical sultancy Organisation (Mitcon) Mr. Prabhugaonkar disclosed that nsortium of five infrastructural de- oment agencies in the state, aided he IDBI and IPCL will help to spur industrial growth in and around othane by 1990-91, with an invest- of Rs. 150 crores.

he MGCC project is itself due to commissioned by mid-1989. The C has taken up, for infrastructural lopment, an area of 300 hectares ired for Nagothane project.

he government of Maharashtra is et up a information cell, for the fit of entrepreneurs, on the scope ocation of industries in the vicini- MGCC, the development of which be actively assisted by the Udyog , functioning under the aegis of tate's industry department, Mr. ugaonkar pointed out.

Mr. S. G. Kale, secretary to the industry department of the Maharashtra government, said, earlier in his welcome speech, that as new materials, new technologies, new applications emerge, new opportunities arise. The IPCL Ltd., the leading public sector organisation, has undertaken the task of establishing the MGCC to convert the natural gas and the associated gas from the Bombay offshore oil-fields.

A number of industrial organisations have come up to establish petrochemical and chemical industries based on the output of MGCC. A range of new plastics materials will be available, reducing the gap between supply and demand, which is outstripping the indigenous supply rapidly.

With the commissioning of MGCC, opportunities in manufacturing, business and trade, service industry and infrastructure services will arise progressively in Maharashtra.

Mr. Kale said Maharashtra being the largest consumer of both 'commodity plastics' and the 'performance plastics' for engineering, special applications, it is felt necessary to increase the awareness of these opportunities and needs arising out of them amongst all the sections concerned with the industrial and economic growth of the state.

To this end, the Udyog Mitra committee of the state government, has decided to take the help of all the corporations of the state government, the Maharashtra Petrochemical Corporation Ltd. (MPCL), Sicom, the DCK, MSSIDC, MIDC, and the MSFC for a joint effort.

Mitcon was assigned the task of preparing the document, which outlines a number of project ideas.

The state government is looking forward to developing an ongoing association, and exchange through such seminars, with the industry, the new entrepreneurs, the academic and technical institutions and the experts in various fields so that the development and growth of this important and emerging technology and industry in the state takes place in a systematic and rapid manner, Mr. Kale stated.

The seminar concluded after the theme was discussed at two technical sessions addressed by experts in the field.

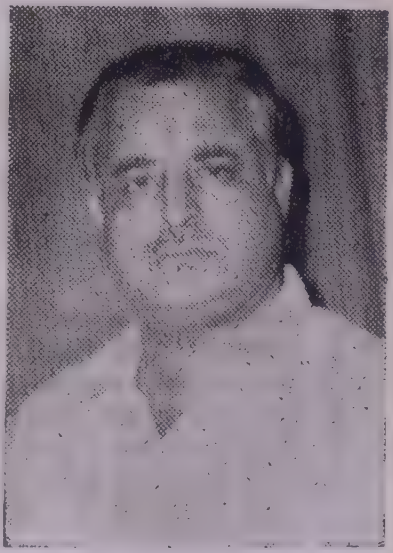
The commissioning of MGCC at Nagothane would make available more ethylene oxide, monoethylene glycol (MEG), diethylene glycol (DEG), as well as tri-ethylene glycol (TEG) and acetylene black. In addition to this, based on small quantity of ethylene to be supplied to other units, production of vinyl acetate monomer and ethylene-vinyl acetate will also start.

Maharashtra has been leading the country in the manufacture of basic petrochemicals building blocks such as ethylene, propylene, butadiene, benzene, methanol, acetone, etc.

In addition to Maharashtra's own units like Nocil, Herdillia, HOC, etc. IPCL's chemical products also find its major market in Maharashtra.

A. K. BASU — MANAGING DIRECTOR OF HINDUSTAN ANTIBIOTICS

Shri A. K. Basu has been appointed as Managing Director of state owned company Hindustan Antibiotics Limited, Pimpri. Shri Basu joined Hindustan Antibiotics Ltd. as Director (Finance) in August 1986.



Born on 5th January, 1940, Shri Basu is a member of Institute of Cost and Works Accountants of India and Indian Institute of Bankers. Shri Basu has wide experience in various public sectors and co-operative organisations like National Newsprint and Paper Mills Ltd., Nepanagar, Indian Dairy Corporation, Bhavnagar, Vegetable Products Unit (NDDB), Bhavnagar and Gujarat Co-operative Oilseeds Growers Federation Ltd., Ahmedabad.

BETTER CO-ORDINATION VISUALISED

Holding co for petroleum sector

The petroleum sector has emerged as the most crucial one in determining the perspective planning of the Indian economy following the increasingly large discoveries of oil and gas in the country.

The question arising out of this scenario is whether this sector is properly co-ordinated or it needs a thorough revamping of the whole set up to meet the challenge of the 21st century's energy targets. The restructuring of the petroleum sector has been discussed in several fora and was also taken up by various committees before, but only now it appears that an exercise is being carried out to see whether there is indeed an urgent need to reorganise the entire petroleum operation in the country.

In several informal discussions at the highest level it has been pointed out that the world over the petroleum sector is organised as an "integrated oil company", such as Statnorway, Petrobras-Brazil, Pemex-Mexico, Petronas-Malaysia, Pertamina-Indonesia, Eni-Italy or multinational such as Royal Dutch Shell, Chevron, Philips Petroleum, British Petroleum etc.

These oil companies — be they in the public sector or the private sector — are involved in all areas of operations, both upstream in the field of exploration and production and downstream such as refining, marketing and transportation.

India is possibly the only exception where the petroleum sector has been split into several sub-sectors, with the government sector like a holding company, without of course having the "form" of the holding company.

Since all the grassroot projects in the petroleum industry are in the public sector, except for a few downstream units which are in the private sector, it is argued that a concept of holding company for the petroleum industry would be a viable one.

In a report submitted by the Arjun Sengupta committee, which was set up to review national policy for public enterprises, the holding company formula was clearly defined and suggest
ed for action.

The report observed: The commit
tee discussed, at length, alternativ
models of organisational structure fo
public enterprises, under which ther
will be a clear division of responsib
lity between the government, as repre
sented by the ministry or departmen
and the management of these enterpr
ses, as represented by board of direc
tors or the chief executive. In shor
the ministry should be responsible fo
the formulation of policy and the ma
nagement should be responsible fo
the implementation of that policy an
the interaction between them shou
be such as to facilitate the exercise
overall government supervision, wit
out impairing the efficiency of oper
tions of an enterprise. Such an org
nisational structure should keep th
operations of an enterprise at "arm
length" from the government and pr
mote decentralised decision-makin
within the enterprise. One such org
nisation, widely practised in many E
ropean countries is that of a holdir
company."

The committee suggested that th
government should set the goals ar
target for the holding company and r
ceive periodical performance repor
regarding the overall efficiency of th
company's operations. According to th
committee, the administrative respo
sibility in respect of individual cor
panies should be that of the holdir
company and the government itse
should not come in day-to-day conta
with the individual companies.

The Sengupta committee's sugges
ion had remained in the files for qui
some time till it was revived by Co
S. P. Wahi, chairman of the Oil ar
Natural Gas Commission. In his pr
sentation before the Standing Conf
rence of Public Enterprises (SCOPE
Col Wahi had observed that "the e
terprises irrespective of the size a
managed as single entities as the a
nual financial reports are prepared
the basis of each enterprise. This
sults in inadequate focus on the fina
cial performance of individual di
sions, departments or groups."

According to him, there is inadqu
te focus on long-term planning, tec
nology upgradation, information tec
nology, human resource developme
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scanning. Col Wahi's advocacy

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g a holding company for the petroleum sector has snowball- v and has become a matter of within the industry.

pointed out that currently, a y-in-charge of a number of pub- terprises, which are mostly uni- mpanies, not only gets involv- h the management boards of the nies but also in the co-ordina- f decisions and activities of nt companies.

holding company structure is ed to introduce an intermediate of management, (that is the boa- the holding company) between inistry and the companies, re- tuted as subsidiary companies. board could also take up the job -ordination between the subsidi- mpanies. As a result, the inter- between the government and the diary companies is minimised, ut sacrificing the essential need -ordination of the operations of ompanies.

e Sengupta committee had re- ended that the government's in- ment should be limited to ap- ment of the chief executive and members of the board of direc- investment, financing and pro- appraisal, target setting, budget, rmance evaluation and broad po- uidelines.

e institution of the government tors should be there as it is felt they are a "positive source of and mediation between the gov- ent and the enterprises". The diaries of the holding company, ver, need not have government tors on their boards.

need for a fresh look at the orga- ional structure in the petroleum r has begun to be felt because e spurt in the activity of explora- and production. More and more veries of oil and gas have increa- "organisational pressure" which be borne only by radical restruc- g of the petroleum sector, accord- o Col. S. P. Wahi.

ydrocarbon exploring companies like C make investments for locating ocarbons. While oil finds are ex- ed through known methods inclu- the application of the concept of production system and where the ets are reasonably well-defined in s of their refining and marketing, roblems are quite substantial when it comes to developing a gas find. The exploring company has no flexibility or authority in decision making for the development of gas fields. The decision in regard to pricing, investments for laying the lines, supply to consumers, etc is under government control.

There are four independent enterprises : gas exploring and producing companies such as ONGC; gas transporting company such as Gail; gas processing companies like refineries and petrochemicals and gas consumers such as fertilisers, power projects and industrial fuel, cement, glass and ceramics, textiles etc.

The important question that emerges is who will initiate discussions, who will make the investment what should be the terms and conditions of the contractual arrangements, the authority for enforcement in the event of any default. These are some of the questions directly concerning gas production companies like ONGC which is required to generate revenues through sale of gas in order to get the returns on exploration expenditure. Col Wahi feels that such questions could get resolved under a holding company structure.

According to him, the present system is detrimental to the development of the existing natural gas resources.

But, the critics of the holding company formula feel that it would merely create yet "another redundant buffer between the government and the companies" with no tangible benefit. Some also argue that the holding company concept is merely "an empire building concept" and it has not taken into account the beneficial aspects of the present structure based on the proper checks and balances.

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Petroleum gas : scope for resource growth in AP

The scope for integrated development of petroleum and gas resources in Andhra Pradesh for the benefit of the southern and eastern regions was very high and could be enhanced by taking timely steps for infrastructural and industrial investments.

This was highlighted in the pre-investment feasibility report for a petrochemical complex at Visakhapatnam, presented to the Chief Minister, Mr. N. T. Rama Rao, by Dr. Bhanu Prasad, Chairman, APIDC on Oct. 12.

Dr. Prasad who was also the Chairman of the committee on gas based industries, which has just completed its deliberations on the optimum utilisation of the Krishna-Godavari basin indicated that in the committee's view, the composition and quantities of gas would justify investment on ammonia/urea facilities, a sponge-iron plant, a combined cycle gas turbine power station with a capacity of 270 mw (3 nos of 90 mw each), ceramic and metallurgical industries in which use of gas can contribute to process efficiency and economics.

The need for providing necessary infrastructural facilities for accelerating gas and oil development was also emphasised by Dr. Bhanu Prasad.

He outlined the details of the strategy for development of olefin capacity utilising the surpluses from the 4.5 mn TPA Vizag refinery by establishing a cracker to process seven and half lakh tonnes of naphtha, to produce ethylene, propylene, butadiene and other streams and downstream projects for manufacture of polyethylene (1,60,000 TPA) vinyl chloride (1,50,000 TPA), polypropylene (1,30,000 TPA) and for earmarkin certain intermediates as raw materia for other industries.

The total investment on plant an utilities as also site development wa placed at Rs. 1880 crores with a fo eign exchange of Rs. 380 crores.

It is stated that necessary techn economic and financial analysis carri out with experts in the field showe that the project investment would yie a high return on investment and ha a short payback period.

Dr. Bhanu Prasad explained to t Chief Minister that the Union Indu try Minister Mr. J. Vengala Rao ar officials of the concerned ministri had shown ready appreciation of t potential for the petrochemical indu try in the State. Mr. Rama Rao is u derstood to have appreciated the c operation received from the Cent department, according to an offic spokesman.

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SAIL to produce chemicals

a part of its major diversification ramme, the Steel Authority of In- Limited (SAIL) has decided to go r the production of 30,000 tonnes prilled ammonium nitrate and 00 tonnes per annum of methanol. e new facilities are proposed to et up in Rourkela at a total cost s. 30 crores.

he current annual demand for prill- ammonium nitrate, which is the n ingredient of industrial explosi- is 80,000 tonnes per annum. In UK, Australia and the US, the bulk the industrial explosives used is in form of ammonium nitrate-fuel oil ch is much cheaper than the nitro- erine-based explosives or slurry losives.

SAIL has the biggest ammonium ni- e manufacturing facility at its ferti- r plant in Rourkela. The govern- nt is of the view that instead of giv- licences for setting of new plants, existing facilities at Rourkela ould be utilised for this growing ex- sives sector, which serves the ent- mining industry.

The current output of methanol is 000 tonnes per annum, besides im- ts of 70,000 tonnes per annum. It an important raw material for pro- tion of formaldehyde, DMT, meth- mines, methylacrylates, a solvent, the production of drugs and phar- ceuticals and for the manufacture acetic acid.

The demand for methanol has in- ased appreciably and has far out- pped all forecasts made by the rking group set up by the govern- nt. Methanol is also used to sub- ute diesel oil. It is an important material for methyl tertiary butyl er which is increasingly replacing d tetra ethyl in the developing co- ries as an octane booster and for ucing automobile exhaust pollution n lead.

Rourkela Steel Plant has a naphtha ning plant which is considered ide- suited for conversion to methanol a nominal cost. A new installation cost about Rs. 60 crores.

SAIL has been serious about a pro- mme to go into the commercial ex- tation of chemical byproducts. The ision to set up the ammonium nit- and methanol facilities at Rourkela are the first positive steps in that direction.

According to a ten-year perspective corporate plan lasting till the end of the century, SAIL has proposed to launch the recovery of coal chemicals from coke oven gas as also the manufacture of value-added downstream chemicals. The thrust will be on the optimisation of byproduct recovery and entering into the fields such as linear alkyl benzene, caprolactam and carbon black.

With the view to fully utilising slag, a byproduct of the Rourkela Steel Plant, a proposal for a slag-based cement plant is also under study.

The SAIL corporate plan, which clearly demarcates the growth horizon upto 2000 AD for all steel-producing units, envisages a total investment of Rs. 15,000 crores for the creation of additional capacity to raise steel output to 15 million tonnes.

CSIR AWARD FOR NCL SCIENTISTS

Dr. K. Ravindranath and Dr. T. N. Guru Row, scientists of the National Chemical Laboratory (NCL), received "young scientists award" instituted by the Council of Scientific and Industrial Research (CSIR).

The award, a cash prize of Rs. 10,000 a citation and a research grant of Rs. two lakhs a year were presented by Mr. Rajiv Gandhi, Prime Minister, in New Delhi on September 26, 1987 at a special function organised by CSIR on foundation day.

Dr. Ravindranath has made outstanding contributions to the area of modelling and simulation of industrial polyethylene terephthalate reactors. His work has led to new insights into the working of these complex polycondensation reactors and, at the same time, it has led to significant productivity and product quality improvement in Indian polyester fibre industry.

Dr. Guru Row has made outstanding contributions in the area of X-ray chemical crystallography. His work has led to the derivation of several structure-function correlations mainly in the flexibility related perfume action in longifolenes and drug action in oxazophosphorings. He has developed several new and novel approaches for solving "difficult" crystal structures which are in use in all the leading crystallographic laboratories in India and abroad.

Dr. Row has developed several models for study of electron density distributions using high resolution, low temperature x-ray crystallography which leads to the derivation of one electron properties. His work on the derivation phylogenic trees with Dr. John Barnabas, head, Biochemical Sciences Division of NCL, has led to very interesting implications in biomolecular evolution.

He is currently engaged in solving structures of biological macromolecules (proteins and enzymes) whose three dimensional structural features can be exploited to perform site directed mutagenesis using molecular biology approaches.

SILICA FROM RICE HUSK

Vikram Sarabhai Space Centre (VSSC) of Indian Space Research Organisation (ISRO) has developed indigenous technology for the manufacture of high purity precipitated silica from rice husk. Precipitated silica is used as a filler cum-strengthenign agent in various rubber and plastic products. The precipitated silica process utilises the ash obtained from combustion of rice husk from rice mills. This is a waste produced in rice mills, causing disposal problems and environmental pollution.

The specifications of precipitated silica developed by ISRO compares very favourably with imported high purity silica.

Specifications : Loss on ignition at 1000 degrees C 10 per cent maximum, loss on drying at 105 degrees five per cent maximum, primary particle diameter 15-20 mm, Fe_2O 0.02 per cent maximum, and pH of four per cent solution — six-seven.

ISRO technology has been developed at mini pilot scale, and ISRO offers to provide the process know-how and engineering package for one ton per day or higher product batch capacity.

For details write to Manager, Technology Transfer, Vikram Sarabhai Space Centre, ISRO post, Trivandrum 695 022.

NAPHTHA CRACKER COMPLEX :

TN assured priority

Mr. J. Vengala Rao, Union industry minister, assured Tamil Nadu that it will get precedence over Andhra Pradesh and Karnataka in getting the naphtha cracker complex.

He was responding to the complaint by the state industry minister Mr. K. Rajaram, at a function that though Tamil Nadu had been pleading for the naphtha cracker complex since 1967, its claim had not been considered. Instead, the plea of Andhra Pradesh and Karnataka, "late comers in the field", had been accepted by the Centre.

Mr. Rao pointed out that neither of the two states — AP and Karnataka — had submitted any proposal and therefore it was not correct to say that they had got clearance from the Centre for the project.

Both were participating in a function organised by the public sector Andrew Yule and Company Ltd. to inaugurate its new facility at Perungudi near Madras.

Mr. Rao took the occasion to assure Tamil Nadu that the Centre, would render all assistance for the development of the state.

Mr. Rajaram in his speech demanded that the Centre should set up a second refinery either at Tuticorin or Nagapattinam in view of the promising oil find in Narimanam and Cauvery basin.

He also reiterated that "taluk" should be the criterion and not 'district' for determining industrial location policy.

Mr. Rajaram lamented that over the years Tamil Nadu's share in Central investment was declining and therefore it was time that the Centre reversed this policy and put in more funds in the state.

At the outset, Mr. K.S.B. Sanyal chairman of Andrew Yule traced the history of the company's growth after nationalisation, particularly the impressive performance of its transformer and switchgear division in Madras.

A sum of Rs. 2.5 lakhs was presented by him to Mr. Rao on behalf of the company towards the Prime Minister's National Relief Fund.

LICENSING POLICY FOR POLYESTER MANUFACTURE MODIFIED

The Union Government has decided to modify its licensing policy for manufacture of polyester to encourage economies of scale in the production of polyester chips and setting up of down stream units by small and medium entrepreneurs.

According to an official press note, the Government would not now insist on potential manufacturers of polyester fibre, yarn and film to set up captive polycondensation plants required for producing polyester chips. They would instead be allowed to buy chips from those companies which have already set up polycondensation facilities or intend to set up such units.

This would ensure that those entrepreneurs, who have limited funds, would not have to set up sub optimal polycondensation plants. It would, on the other hand, encourage existing companies having such plants to expand them to economic capacity so that they can sell surplus chips in the open market.

The press note says that the Government would, thus, favourably consider permitting existing polycondensation units to reach minimum economic size of 15,000-tonne production of chips to other down-stream units. The units would, however, be required to obtain requisite endorsement on their licences for securing this permission.

This policy change is in accordance with the report prepared by a special committee on the petrochemicals industry. The committee, which submitted its reports in mid-1986, was headed by the then Secretary, Department of Chemicals and Petrochemicals, Mr. D. V. Kapur.

The press note also says that the policy has been changed keeping in view representations of the industry that setting up captive chip production unit causes unnecessary burden of heavy capital requirement. The small and medium entrepreneurs are, thus, not able to enter this industry.

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rosene feedstock for Reliance LAB plant

a view to ensuring the ' between the linear alkyl ben- AB) plants being put up by Industries and the Tamil Petroproducts Ltd. in regard to dstock, the ministry of chemi- d petrochemicals has requested roleum ministry to consider pro- kerosene for the Reliance pro-

was indicated by Mr. R. K. ndra Singh, minister of state for als and petrochemicals, in a th newsmen at Madras on Oct.

lying to a question whether the ty of the Tamil Nadu Petropro- Reliance request for use of pa- was conceded, Mr. Singh said n as feedstock came into the e because of the inability expres- y the petroleum ministry in 1985 ke available kerosene for the ce plant.

e minister said that Tamil Nadu's project viability was an important r which, he said, could be ensur- the "adjustment of duties". how an adjustment was possible the request was for paraffin im- without duty, Mr. Singh said the question was under the consid- n of the government. It had re- d feedback from Reliance, Tamil Petro-products and others and was being examined.

out other chemical projects, the ter said two more PTA plants had planned besides the one being p by Reliance Industries. One project had been proposed by ladras Refineries which had been d a letter of intent. The IPCL, a, was interested in the project, he government had not taken a decision on the matter, as the ed project report was yet to be tted by MRL. The other PTA t had been proposed as a joint venture in Uttar Pradesh. The sector partner had not been iden- Both plants are expected to a capacity of 150,000 tonnes of each. PTA is a substitute raw ial for DMT.

added that the government had d to a change in the product-mix sed by Haldia Petrochemicals he unit was expected to go on stream by 1991-32. Other projects on the anvil were the Hazira Petrochemical complex with downstream units with an estimated investment of Rs. 2,000 crores, the Vizag Petrochemical project involving an investment of Rs. 1,800 crores, the Madras aromatic complex with an investment of Rs. 800 crores and the proposed Mangalore Refinery project along with the cracker unit at an investment of Rs. 1,100 crores.

The Maharashtra gas cracker project was expected to be commissioned by October 1989. There was strong possibilities of another gas cracker project using natural gas as feedstock coming up along the HBJ pipeline, as one or two fertiliser units in Madhya Pradesh based on gas were not likely to come up.

On drugs, Mr. Singh said the government was considering subsidising essential drugs figuring in Category I & II of the new Drug Price Control Order. He said the government had revised upwards the prices and mark-ups for drugs in order to improve the viability of the industry and compensate manufacturing units for rise in input costs.

He hinted that subsidising of drugs would be through a reduction in sales tax. The new Drug Control Order was expected to give a fillip to the industry, so that the target set for 2000 AD could be met. There was also good scope for increasing the exports. There would henceforth be better monitoring of the price mechanism and there should not be any fear of undue escalation of drug prices.

On molasses, Mr. Singh said the government opted for the retention of control on prices and distribution, because the overwhelming opinion was in favour of it. There was enough buffer stock of molasses. The excise duty on potable alcohol would offset the duty for chemical industries and no big price increase was anticipated. The government was also exploring the posibility of exporting some quantity of alcohol.

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Capital goods sector to get further boost

The Planning Commission has formulated a package of measures to further develop the capital goods industry.

In the package, crucial importance is given to a procurement policy against the mere emphasis on commercially proven technology as announced recently in the measures for technological upgradation of the machine tools industry.

While welcoming the measures announced by the Government, a Planning Commission note has pointed out that technological upgradation in the capital goods industry would not take place just on its own account. Rather, a demand has to be created in the user industries.

As such, an innovation-oriented procurement policy is essential. Such a policy will not only ensure the adoption, but more importantly, the diffusion of effective production technology.

The note has identified four main elements of this policy. These are standardisation of performance specification; a system of development ordering; a regular and systematic process of interaction between users and manufacturers to identify requirements at an early stage; and highly attractive fiscal instruments like accelerated depreciation to create a demand for new technologies.

According to the note, there has to be a deliberate policy to increase capacity utilisation in the capital goods industry as without the prospect of increased sales, no producer will upgrade technology. Also, the structure of public investment itself will have to be reviewed to activate surplus capacity by creating a Keynesian type of demand through fiscal and monetary measures.

The note also lays emphasis on integration of the electronics industry with the capital goods industry. It is pointed out that the heart of technological development in the capital goods industry lies in the introduction and diffusion of micro-electronics-based techniques.

Though this process of integration has just started in India, the large number of collaborations in the field of electronics are unlikely to keep India at the technological frontier. In this regard, it is pointed out that in almost every country the process of "electronification" of the capital goods industry has been given a shot in the arm by the Japanese company, Fanuc, which holds a monopoly on controls technology. As such thought should be given to inviting Fanuc to India and using it as a base for world-wide operations.

According to the note, technological change will have to be accompanied by major marked restructuring and industry-wide policies will have to be backed by firm-specific initiatives. Since not all firms in the capital goods industry can be made competitive, some of them will have to close down.

Simultaneously, greater product specialisation will have to be introduced in the firms that survive. A product specialisation strategy will also have to be adopted in the case of the small-scale sector which has emerged as a sub-contractor.

According to the note, special technology delivery mechanisms will have to be instituted to boost modernisation efforts of small-scale producers. Since most of the small units are concentrated in a few areas, a "cluster" approach can be usefully adopted. Investment policy in the small-scale sector will require to be changed if new technologies are to penetrate the small-scale sector.

Small-scale industries account for over two-thirds of all machine tools installed in India. As such, technological development of the small-scale sector has to be linked to needs and requirements of this sector and must result in products that are affordable by it.

Since upgradation and modernisation in the capital goods industry will not be without its impact on labour, the note has suggested creation of an adjustment assistance fund to provide resources for redeployment and retraining of the affected work force.

The note has pointed out that ultimately jobs will have to be provided, if not to the workers affected by modernisation, then to their children who may be more amenable to being trained in new skills and techniques.

This will call for micro-planning to attract new jobs in regions that will be affected by the introduction of new technology. An institutional mechanism will have to be created and operated by State and local Governments to aid in job training, job creation, job search and actual placement.

Since modernisation has to be a continuous activity and not a one-time exercise, special fiscal incentives will need to be devised. In this regard, the note has suggested a modernisation allowance by which profits to the extent of 20 per cent of investments in modernisation earned by a unit after implementation of its programme would be eligible for deduction from taxable profits.

BACKWARD AREA SUBSIDY TO GO

Subsidies for backward area development are likely to be abolished soon. The Union Cabinet is expected to take a decision to this effect shortly, Mr. Vengala- Rao indicated on October 10, while presenting awards to six most successful projects promoted by the Tamil Nadu Industrial Development Corporation (Tidco).

Mr. Vengala Rao said the subsidy schemes are proposed to be replaced by a policy of promoting growth centres. About 150 growth centres are envisaged, each entailling an investment of about Rs. 20 crores. The awards for successful projects have been instituted by Tidco, the first of its kind by any state development corporation.

The industry minister said the new policy is being framed on the basis of a report submitted by secretary to the Planning Commission suggesting measures to secure wider dispersal of industries. The Prime Minister also favoured abolition of subsidies.

He said it was proposed not to allow any industrial unit to come up within 75 miles of a big city and within 40 miles of municipal towns.

The award winners included among others, Spic, Tamil Nadu Dadha Pharmaceuticals and Dynavision Limited.

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Cut in drilling time saves ONGC Rs. 153 Crore

The Oil and Natural Gas Commission (ONGC) has achieved a saving of Rs. 153 crores over the past few years by reducing the drilling cycle time of its rigs deployed across the country.

The Commission sources said at Calcutta on 13th October that the cycle speed considered a reliable pointer to drilling efficiency, stood at 705 in 1986-87, up from 475 recorded in 1980-81. The Commission expected to touch the 744-mark in 1989-90, the terminal year of the Seventh Plan.

The drilling operation, incidentally, was the most capital-intensive activity, involving about two-thirds of total spendings made on various stages in between oil exploration and exploitation.

The strategy adopted to pare off the prohibitive drilling costs, the sources said, was most effective in the eastern region where a number of E-760 rigs made by BHEL and D-21 Russian rigs were in operation.

In the ordinary run of things, an E-760 rig with sky top design sub-structure and mast consumed longer time as it required heavy duty long boom cranes for rig building operations. With the new strategy in operation, the normal building time of 35 days had been slashed to seven days thus saving about 28 rig days. In terms of financial gains, the Commission saved about Rs. 4 crores in 18 rig building operations over the past few fiscal years.

As for the D-21 Russian rigs, the strategy enabled the Commission to lessen the rig building time by about 15 days. Consequently, the extent of saving was around Rs. 9 lakhs per rig building operation. By an official estimate, the total saving every year was in the region of Rs. 35 lakhs.

The Commission, which had put an accent on increasing rig productivity, had adopted measures to redeploy rigs which had been laid off for their obsolescence.

The sources said the redeployment of 13 such rigs had resulted in saving of the capital cost to the tune of Rs. 90 crores which other-wise would have been incurred for obtaining ad ditional rigs. The value of service rendered by the rehabilitated rigs was in the region of Rs. 30 crores.

According to them, ONGC was planning to put into operation a few mobile rigs in the eastern region shortly. Scheduled to replace the existing BU-75 and 5D rigs, the mobile rigs with higher cycle speed would be obtained, using a World Bank line of funding. These apart, plans were under way to introduce specially made desert rigs in Rajasthan where drilling by conventional rigs was an expensive business.

DRILLING OFF COCHIN TO BEGIN SOON

Preliminary studies by the Oil and Natural Gas Commission (ONGC) have indicated the possibility of oil reserves to the tune of around 400 million tonnes off Cochin coast.

As part of the detailed exploration in the area which has been named 'Cochin-high', drilling is expected to commence at around 35 km from Cochin, according to informed sources.

Already the drilling rig by name "Sixilinefield-95" has started moving towards the Kerala coast from Bombay-High.

The sources denied reports about possible delay in drilling off Cochin though they declined to elaborate on the progress of the work there.

There were reports from certain quarters earlier that oil exploration off Cochin would be further delayed because of the non-availability of the drilling rig.

DGTD SETS UP GROUP ON BIOTECHNOLOGY

The Director General of Technical Development (DGTD) has set up technology advisory groups in selected sectors of industry and one of the groups is on "fermentation technology and industrial applications of biotechnology".

The main objective of these groups is to identify the technology gaps and suggest action plans to bridge the same.

Announcing this at a seminar on "Biotechnology", organised by the Process Plant and Machinery Association of India in Bombay on Oc.t 5, Mr. P. R. Latey, Secretary, Technical Development (TD) and Director General of Technical Development (DGTD), said that the group on biotechnology is presently in the process of formulating its recommendations. Any suggestions from the Association with regard to the equipment and instruments that may be required to be developed would be very useful.

Pointing out that the biotechnology process would be specialised in nature and different than the conventional chemical and mechanical processes, he said the manufacturers would have to develop, design and manufacture equipment according to the needs of biotechnologists.

The equipment manufacturers and biotechnologists are therefore intimately linked and he advised them to work in close co-ordination.

Conceding that it would not be easy to get the design, know-how or equipment from abroad as foreign suppliers will insist on supplying a particular equipment stating that it was proprietary in nature and detailed specification could not be divulged, Mr. Latey said it is imperative that development work be carried out by the manufacturers locally.

He did not forsee any difficulty regarding the funds required for such development or for updating the technology from such bench scale to commercial production. Financial institutions such as IDBI, ICICI could be approached for funding suitable projects, he added.

GSFC BAGS AWARD FOR FIFTH YEAR

The Gujarat State Fertiliser Company (GSFC) has bagged the current year's first prize instituted by the Fertiliser Association of India for the best overall performance in phosphatic fertiliser production.

The company has also won the runners-up award of the FAI for the best overall performance of ammonia plant, a GSFC release said on Bombay Oct. 11.

This is the fifth consecutive year that GSFC has won the phosphatic fertiliser award. The award would be presented to the chairman and managing director of the company, Mr. Moosa Raza, at the FAI annual seminar at New Delhi in early December this year, the release added.

GSFC's most plants exceeded 100 per cent of the designed capacity and overall capacity utilisation was as high as 115 per cent during last year, the release added.

Rs. 36 Cr. dividend from ONGC

The Oil and Natural Gas Commis- n (ONGC) has paid a record divi- d of Rs. 35.99 crores to the Union vernment for the financial year 86-87. The cheque was presented the ONGC Chairman, Col. S. P. ahi, to the Minister for Petroleum d Natural Gas, Mr. Brahm Dutt. The vidend payment by ONGC to the vernment is the highest so far paid any public sector undertaking in the untry.

ONGC has recorded impressive ancial and physical perfor- ances in 1986-87. The total venue earned by it during e period was Rs. 5627.39 crores. By hieving a net profit of Rs. 1484.45 ores, ONGC has retained its top- ost position amongst the profit-mak- g companies.

This is an index of the commis- on's growth with stability, increasing oductivity through improved efficiency operations as well as deliberate cost ntrol measures and enhanced capa- ty to generate surpluses.

During 1986-87, the crude oil pro- ction was 27.36 million tonnes, ex- eeding the planned production tar- ts set for the year. ONGC establi ed a new milestone in gas sales by oducing over five billion cubic met- s of natural gas, which is 136 per nt of the planned target.

The actual LPG production was 451 ousand tonnes which is as much as per cent more than the targeted oduction. The total production in rms of oil and oil equivalent of gas ounts to 32.89 million tonnes.

The contribution by ONGC to the ntral and State exchequers during 86-87 has risen to Rs. 3113 crores m Rs. 2215.70 crores in 1985-86.

The commission has met its finan- l resource requirements for develop- nt and growth primarily through its ernal resources.

Eighty-eight per cent of the total ancial resources were generated in- nally, while the remaining was met ough commercial borrowings.

n the first two years of the Seventh n (1985-87), targets in almost all areas of operation have not only been met but overshot. During these two years, ONGC has already added reserves to the extent of 199.41 million tonnes of oil equivalent of gas in comparison to 333.50 million tonnes reserves added during the Sixth Plan (1980-85).

ONGC is poised for continuous growth in the remaining period of the current Plan. It envisages 60 per cent increase in crude production, 201 per cent in gas sales and 301 per cent increase in LPG production as compared to the sixth Plan.

RS. 25 CR. SOFT FERRITES PLANT FOR AP

The Hyderabad Suchitra Electronics Group, which registered rapid growth during the last decade under the stewardship of the technocrat enterpreneur, Mr. K. Krishnam Raju, will be setting up a Rs. 25-crore soft ferrites manufacturing plant. Foreign collaboration agreement with Thomsons CSF of France has already been signed and the unit will be located on the Medchal-Toopran road, about 50 km from Hyderabad.

The group has also drawn up plans to enter manufacture of electro-plastic items like Noryl and PBT at its Yanam (Pondicherry) unit under the name Suchitra Electro Plastic Ltd.

It is envisaged that these products being import-substitutive will save enormous foreign exchange for the country. Speaking to a visiting team of newsmen at the Yanam unit of Suchitra Components Ltd., manufacturing flyback transformers and deflection yokes for TV industry, Mr. Krishnam Raju, Chairman of the company explained that when the full production of three lakhs yokes and five lakhs flyback transformers was attained in the next six months, it would result in a net saving of Rs. 3 crores of foreign exchange per annum.

The Rs. 2.25-crore Yanam project was based on technology, plant and know-how from Korea Data Systems Ltd. and implemented in eleven months time. Being the first of its kind in the country it is expected that Suchitra will gain a 60 per cent market share for these two products netting an annual turnover of Rs. 30 crores. The plant is geared to meet designs of any TV manufacturer which was unique, Mr. Raju said.

Located at Yanam to gain the benefits of 'A' class backward area under Pondicherry Government, the sophisticated plant and machinery supplied by Korean Collaborators is fully automated to ensure minimum manual hendling and fully airconditioned for dust proofing.

Detailing the activities of the Group Mr. Raju stated that annual turnover for the current year is estimated to touch Rs. 30 crores which would cross Rs. 100 crores by 1989-90. This excluded the new projects finalised by the Group.

The Rs. 11-crore project of Suchitra Teletubes Ltd., completed at Manoharabal near Hyderabad for manufacturing one million B and W TV picture tubes has just commenced commercial production. At full capacity it will attain Rs. 45 crores turnover per annum.

Mr. Raju stated that the Group has always kept up the idea of manufacturing high quality import substitute electronic items and successfully commissioned the two projects to manufacture B and W picture tubes and the deflection yokes and flyback transformers. The soft ferrites, manufactured again for the first time in the country, is being promoted by the flagship company of the Group, Suchitra Electronics Ltd.

IBP PAYS DIVIDEND

The Indo-Burma Petroleum Company Ltd. (IBP) chairman, Mr. M. S. Khanna, presented a dividend cheque of Rs. 45.82 lakhs to the Union minister for petroleum and natural gas, Mr. Brahm Dutt. The amount represents payment against the 20 per cent dividend for 1986-87 due to the government on its equity capital of Rs. 18.75 crores.

According to an official release, IBP registered a turnover of Rs. 752 crores in 1986-87 against Rs. 665 crores in the previous year. The company earned a net profit of Rs. 8.33 crores during the year against Rs. 4.79 crores in 1985-86. The net worth of the company increased from Rs. 21.79 crores to Rs. 29.34 crores and capital employed from Rs. 27 crores to Rs 28.95 crores.

Rs. 374 Crore loss likely for CIL

Coal India Ltd. (CIL), which targets 158 million tonnes of production by the end of this fiscal year, is likely to end up 1987-88 with a loss of Rs. 374 crores, according to an action plan document of the Department of Coal. The Eastern Coalfields and Bharat Coking Coals Ltd. would continue to drag heavily on CIL exchequer.

One significant thing is that Central Coalfields and Western Coalfields, the two profit earners in the CIL set-up would turn red this year after the restructuring of those two subsidiaries and coming up of two new subsidiaries, namely Northern Coalfields Ltd. and South Eastern Coalfields Ltd. which are estimated to earn profit during this financial year, according to the action plan.

The loss making subsidiaries is led by BCC with Rs. 257.61 crores, followed by Eastern Coalfields Rs. 149.56 crores, Central Coalfields Rs. 83.18 crores and Western Coalfields Rs. 30.63 crores. At the bottom of the ladder is North Eastern Coalfields which might incur a loss of the order of Rs. 72 lakhs. Of the seven subsidiaries, only Northern Coalfields and South Eastern Coalfields are estimated to earn profits of Rs. 67.86 crores and Rs. 74.58 crores, respectively.

According to Department of Coal's projection, at the end of the first half of the current financial year (April-September), the total loss is estimated at Rs. 352.63 crores. The subsidiary-wise break up (in Rs. crores) is: Rs. 107 by ECL, Rs. 149.68 by BCCL, Rs. 75.80 by CCL, Rs. 12.03 by WCL, Rs. 4.87 by SECL and Rs. 3.25 by NEC. The only subsidiary which, according to the action plan estimate, is likely to earn profit in the first half is NCL with Rs. 20.99 crores.

While in the second half most of the subsidiaries would continue to incur loss, two subsidiaries, namely NCL and SECL would earn substantial profit. In the case of NCL which was in the red till the end of second half, would not only turn the corner but would end up the year with a substantial profit. Thus, the profit estimated to be earned by NCL and SECL is put at Rs. 79.45 crores and Rs. 46.87 crores, respectively. Though in the second half NEC would earn Rs. 2.53 crores profit, ultimately the year will end up with a loss.

The loss, which the subsidiaries are estimated to incur in the second half would be, however, lower. Thus ECL's loss between October and March, 1988 is estimated at Rs. 42.56 crores, Rs. 107.87 crores by BCCL, Rs. 7.28 crores by CCL, and Rs. 18.60 crores by WCL. Besides these, seven subsidiaries whose total performance is a negative one with Rs. 379.26 crores loss is marginally negated by the Coal Mines Planning and Development Institute's Rs. 1.83 crores profit and CIL stockyard's profit of Rs. 2.76 crores.

The gross margin of all the seven subsidiaries before depreciation and interest is estimated at (Rs. in crores): (—) 13.70 by ECL, (—) 121.94 by BCCL, (+) 14.75 by CCL, (+) 139.60 by NCL, (+) 56.55 by WCL, (+) 196.48 by SECL, and (+) 5.11 by NEC.

The Department of coal's profit/loss projection, however, does not include a major factor which is bound to have serious impact on the overall economy of CIL, by increasing the loss substantially provided matching price increase is not effected.

The operating cost of Rs. 3392.83 crores does not include the impact of the fourth national coal wage agreement. It also does not take into account the consumer price index at 710 and assumes no major increase in power tariff and major stores items. That apart, sales turnover is based on net realisation of Rs. 202.16 per tonne and estimated revenue production of 152.5 million tonnes.

Meanwhile, going by the stock figures at the end of second half it appears that the Department of Coal's estimate of 19.63 million tonnes of pithead stocks at the end of September is belied by the actual performance. According to CIL, pithead stocks at the end of September, 1987 stood at 21.84 million tonnes.

According to the action plan of the Department of Coal, the pithead stock at the end of 1987-88 is estimated at 26.83 million tonnes against 28.30 million tonnes at the end of 1986-87. The subsidiaries pithead stocks at the end of the current fiscal year is estimated at (in million tonnes): 4.73 with ECL, 4.88 with BCCL, 8.55 with CCL, 1.09 with NCL, 1.46 with WCL, 5.65 with SECL and 0.47 with NEC.

PREPARATORY WORK FOR LEAD-ZINC COMPLEX IN RAJASTHAN BEGINS

The preparatory work of new lead-zinc complex in Rajasthan, based on the rich lead and zinc deposits in Rampura and Agucha areas, has begun.

Inaugurating the annual general meeting of the Indian Non-Ferrous Metal Manufacturers in New Delhi, the Minister of Steel, Mr. M. L. Fotedar said that the project would be completed during the Eigth Plan. The project was aimed at meeting the demands for the metals during the coming years. By implementing the project, a sound base would have been completed for the metallurgical industry in the country.

Mr. Fotedar expressed happiness at the creditable performance by the public undertakings under his Ministry. He said that a bauxite project at Damanjodi had been commissioned. The first phase of the aluminium refinery and the smelter in Orissa were under trial production and the complex was expected to be commissioned to full capacity by 1990.

While appreciating the relief work done by public undertakings for drought relief work, he called upon private industries to do similar work.

STAY ON JUTE BAGS USE VACATED BY ANDHRA HC

The court injunction restraining the implementation of the Union government's order for mandatory use of jute bags in the specified proportions in packing cement and non-corrosive fertilizers under the parliamentary Act has been vacated by the Hyderabad High Court.

The sentiment of the gunny market, which became nervous following the injunction, has turned jubilant.

Industry sources, however, complained that the implementation of the order before the injunction was clamped was so "imperfect" that its impact was never felt. Sources hope that the Centre from now would implement the provisions of the Act more strictly to the benefit of the industry.

Meanwhile, many cement and fertiliser units have increasingly started using synthetic bags which are cheaper than jute bags.

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KITS IMPORT FOR FERTILISER PLANTS :

IDBI moots global bidding

The Industrial Development Bank of India (IDBI) has suggested adoption of a system of international competitive bidding for import of technology, engineering and equipment, for setting up of fertiliser plants in India.

Agencies participating in competitive bidding may also be required to indicate fees for technology and basic engineering and prices for plant and equipment if repeat orders are given to them in a medium-term time frame, allowing for likely technological improvements the agencies might incorporate during the period.

A review of the fertiliser industry made by IDBI says that adoption of a system of international competitive bidding is essential, considering the limited number of foreign agencies providing equipment, technology and engineering and in view of the continuous technological advances being made in the field.

The review says that in future investment cost per annual tonne of urea for grassroot projects based on naphtha or natural gas is likely to be five to seven times higher than t' actual investment cost (per tonne) of naphtha-based plants which came into production in the mid-seventies.

As such, it is necessary to ensure that the capital costs of new plants being planned are kept to the minimum by securing the best possible prices and fees for imported equipment, technology and engineering.

The international competitive bidding system should be adopted for the remaining three gas-based projects on the H.B.J. gas pipeline. This could help bargain the best possible fees and prices without loss of efficiency in technology and quality of equipment, besides enabling better spares, inventory management through maintenance of a common pool.

The review says that unfavourable weather conditions affected agriculture, and growth in fertiliser consumption fell short of the target of 8.7 per cent in 1986-87. During the same year, fertiliser industry offered discounts amounting to Rs. 400 crores. In early 1987 market discounts per tonne were in the range of Rs. 450 Rs. 550 for urea, Rs. 650 Rs. 750 for DAP and Rs. 200 Rs. 250 for SSP.

This is likely to affect the financial performance of fertiliser companies. Among the profit-making public sector companies profits of 3 companies have shown a declining trend during 1984-87. Two other companies continue to make losses. In the co-operative sector, profits of IFFCO have shown a declining trend during 1984-87.

Of the 31 IDBI assisted units with outstanding loan assistance of Rs. 336 crores as of December 1986, three SSP units were in default in the payment of dues to IDBI.

However, financial data on operations of a sample of five IDBI-assisted large fertiliser companies show that the pre-tax return on gross capital employed declined in 1986 compared with 1985 in the case of two companies. The pre-tax profits to sales ratio declined in two companies and remanied constant in another.

The review says that the need for reducing the strain of growing subsidy on budgetary resources is being increasingly felt. While sufficient price incentive for increasing fertiliser use by farmers would continue, necessary emphasis would require to be placed also on reducing the incidence of inefficient use and application of fertiliser that subsidies generally tend to encourage.

Higher use-efficiency in the application of fertiliser would help enhance farmers' ability to share an increasing part of the real cost of fertiliser production.

A gradual increase in ultimate prices at regular intervals consistent with the increase in crop productivity, agricultural prices and farm incomes may help promote efficient use of fertiliser. The ability of the farmers to pay higher prices and effectiveness of a pricing strategy to promote fertiliser use-efficiency, however, would depend on adoption of proper cropping pattern, high yielding varieties, improved crop management practices as also use of super granule fertilisers, liquid and fluid fertilisers and modern spraying or injection appliances that facilitate better absorption of fertilisers by plants.

The review says that the real cost of fertiliser production has also to be reduced through productivity and efficiency improvement efforts at fertiliser plants. The administration of retention price scheme should ensure that, (I) The announcement of retention prices for a particular pricing period is made at the beginning of the period, (II) The retention prices are not revised with restrospective effect in the event of delayed announcement, and (III) The efficiency improvement efforts and investments by plants are positively encouraged by allowing the plants to gain from such efforts and putting up "best" performance in respect of consumption of inputs.

In this context, the review says, it may also be considered whether the present system of fixing unit-wise retention prices based on unit-wise detailed performance data needs modification. Fixation of same retention prices for groups of plants of similar vintage and using same feedstock may induce greater efforts at efficiency improvement on their part.

While capacity targets set for 1989-90 are likely to be achieved, the review says, investments on additional capacity has to be made to meet growing demand during 1999-2000 AD. Gas reserve in Krishna-Godavari basin fields may offer opportunities for new fertiliser projects and the proposed plant of Nagarjuna Fertiliser may consider switching over to gas as feedstock.

Investment in new large gas-based plants may be considered when adequate availability of gas in Krishna-Godavari Basin is firmly established and to the extent inter-regional demand-supply gaps and transport considerations favour location of additional capacity in the region.

Also, it may be desirable to make a cost-benefit evaluation of the proposal for replacement of very old plants by new medium-scale plants based on new designs being developed for 450-500 tonnes per day plants.

These plants have reported advantages of short gestation period, low spares inventory requirement, less complex management problems, low distribution costs and phased capacity expansion through installation of additio-al spares in response to demand rowth.

The review says that the sluggish rowth in fertiliser consumption lead- g to large inventories and discounts oints to the need for more accurate precasting and review of demand and loser coordination among agencies in- olved in production, import and dis- ibution.

There is also a need to broad-base ertiliser consumption. Currently, it is stimated that only about one-third of e cropped area benefits from fertili- er application. Again, among areas where fertiliser is used, there are pockets which account for a relatively large share of total consumption.

The future growth of consumption would depend on extension of fertiliser use to more areas including dry-land farming. In sulphur-deficient soils, particularly areas covered under national oilseeds and pulses development programmes, there is considerable scope for prompting use of SSP fertiliser. Sales promotion efforts, sales targeting and marketing are likely to assume greater importance in future, the review says.

RCF ranks number one amongst fert. units

The Rashtriya Chemicals & Fertili- ers Ltd. has overtaken all other fer- lizer manufacturers with a production f more than 2 million tonnes of fer- lizers during 1936-37, registering an ncrease of 19% over the previous ear. The sales turnover has exceed- d Rs. 692 crores against Rs. 478 cro- es last year, securing for it first rank mongst all fertilizer manufacturers in e country. The gross profit has scal- d new heights at Rs. 195 crores dur- g the same period.

Mr. Duleep Singh, Chairman & Ma- aging Director of RCF, presented the irectors' Report to the shareholders the 9th Annual General Meeting of e company held at Bombay. Speak- g at the Annual General Meeting, r. Singh disclosed that inspite of the ghly fluid situation which the ferti- zer industry had been experiencing uring the past 2 years, the company's erformance during 1936-87 has been asonably satisfactory. The sluggish emand and floating marketing condi- ons had pegged the company's sales Rs. 692 crores only against the sale lue of production placed at Rs. 760 ores. As is known, the fertilizer in- ustry was passing through a critical ase owing to multifarious factors hich had a remorseful effect on the anufacturers, Mr. Singh informed the areholders. He further disclosed at the gross profit at Rs. 195 crores s an all time high record and was ore than Rs. 29 crores as compared 1985-86. The inventory of 12 lakh nnes of fertilizers held by the com- ny at the end of the year had erod- the profitability of the company d was a hindrance to register the re- isite growth rate. The net profit of Rs. 20.11 crores was reasonable when compared to the fertilizer scenario obtainable in the country. The heavy discounts offered by the trade to offload stocks had affected everybody including RCF. The depreciation alone had accounted for Rs. 105 crores out of the gross profit, and interest charges of Rs. 66 crores had taken the cake out of the gross profit, Mr. Duleep Singh informed the AGM.

Trombay Highlights :

The production of urea at 4.44 lakh tonnes at the Trombay I and V was more than 13% over the previous year. The complex fertilizers at 5.62 lakh tonnes during 1986-87 showed an improvement of 11% over the last year. Another heartening feature was that the total nitrogen production is almost 100% of the full rated capacity. The capacity utilisation of the 22 years old Ammonia, Urea and Complex Fertilizer plants was 94%, 101% and 88% respectively during the period under report.

The 21 year old Methanol plant achieved a capacity utilisation of 100%. The production of nitric acid at 2,44,100 MT was an all time high, and the capacity utilisation touched 99%. Another accomplished feat of the nitric acid plant was non-stop run of 100 days from 12-10-1986 to 19-1-1987, never achieved in such like plants the world over.

The Trombay V Urea plant produced 3,34,110 MT of Urea, representing 101% of the installed capacity.'

Thal Performance :

The Thal plants of RCF continue to forge full steam ahead with a record production of 10,42,760 MT of Urea during the year 1986-87. The most significant achievement was the record monthly production of 1,27,130 MT of Urea and 78,066 MT of Ammonia during December 1986. These constituted 103% and 105% of the average monthly rated capacity of the plants.

The Thal Unit has become a springboard of RCF, being the latest generation large capacity low energy plant using the Bombay High Gas. It has already put up a mercurial performance by producing 2.5 million tonnes of Urea since inception. The unit had gone into commercial production in June, 1985. The value of this production is placed at Rs. 1000 crores.

Marketing Highlights :

In a fiercely competitive market, RCF was able to sell 16.60 lakh tonnes of fertilizers during 1986-87 as against 11.31 lakh tonnes during the previous year, registering more than 47% growth rate. RCF continued to maintain the high product quality of its brands which already enjoy credibility amongst the farmers. RCF's premier product i.e. Suphala (15:15:15) and (20:20:0) in granules and prills respectively enjoy unassailable reputation amongst the users.

The other inbuilt services provided by RCF like fertilizer promotion, fertilizer demonstration, Krishi mela/soil testing/Fertilizer Days, dealers training programmes were arranged during the year.

The turnover of RCF manufactured industrial products went upto Rs. 60.13 crores, registering an increase of 11% over the last year. RCF continues to be the coordinating agency for arranging imports of Ammonia for the Indian fertilizer industry and assumed significant importance during the year 1986-87 when the ammonia imports reached a record figure of 4.95 lakh tonnes against 3.51 lakh tonnes during the previous year. RCF has the distinction of purchasing ammonia at the lowest US $103.5 per MT C&F Indian ports, saving considerable precious foreign exchange for the country.

Research & Development :

RCF continued to forge ahead in the field of research and development by developing new products. The facility for the production of N-15 tagged fertilizer achieved 6% of its capacity in the first year itself.

A 50 Kg/hr benchscale plant for Ammonium Poly Phosphate was suc cessfully commissioned and operated. The data obtained from this unit has been used to design a 500 kg./hr pilot plant. The procurement action for the above unit has already commenced.

In collaboration with the National Chemical Laboratory, a zeolite based catalyst has been developed for optimising production of Methylamines. In order to test this catalyst in actual plant conditions a mini-reactor has been designed and is being ordered.

A new product called Urea Nitric Phosphate has been developed by our R & D and a bench scale facility having a capacity of 10 kg./hr has been commissioned to study the various reactions and granulation parameters on this new product which eliminates the use of scarce sulphur which has to be imported.

Exports :

RCF's efforts in developing the export of Methylamine based products were very successful in 1986-87. With further improvement in indigenous availability of Ammonium Bicarbonate, contacts are being established in the international market for its export. A consignment of 20 MT of ABC has recently been exported to Malaysia earning valuable foreign exchange for the country.

Modernisation schemes :

RCF has embarked on a Rs. 100 crore ambitious programme to revamp its 22 year old plants at Trombay. The rehabilitation of the Suphala plant at a capital cost of about Rs. 15 crores has already been completed on schedule and has been commissioned. This would restore the capacity, improve the nutrient efficiency by total recycling of effluents and reduce the pollution level.

The proposal to revamp the old Ammonia plant at Rs. 52 crores is under implementation. This would upgrade the technology from partial oxidation process to steam reforming process, which is more energy saving.

The revamping of the Methanol plant by adopting the latest low pressure synthesis technology is already underway and is estimated to cost Rs. 15 crores. The pollution control scheme in the old Urea plant is also being implemented vigorously. It would modernise the evaporation and Ammonia recovery systems

Heavy Water Project :

The Heavy Water Plant put up by RCF at Thal on behalf of the Atomic Energy Commission continues to be in full operation and has been stabilised. This plant was completed and commissioned during 1986-87. Set up at a cost of Rs. 187 crores, it has a capacity to produce 110 MT per annum of nuclear grade Heavy Water.

Diversification :

RCF has embarked upon to diversify into other fields to / increase the profitability of the company. It is planning to diversify in fields like Electronics, Petro-chemicals and other hi-tech areas. As a first step in this direction, RCF is joining hands with M/s Bharat Electronics Ltd. for the manufacture of 1 million Black & White TV glass bulbs, the demand for which is presently being met by imports. We have plans to increase the capacity to 2 million bulbs and also go in for the manufacture of Colour Glass Bulbs, with a total investment of about Rs. 164 crores. RCF is also planning to enter the Petro-chemicals field in items like Elastomers etc. Avenues for putting up joint ventures in other Gulf countries with the expertise available with the company are being explored. The investment in these diversification activities would involve an outlay of Rs. 1100 crores which would be met entirely out of the company's funds.

RECORD OUTPUT, SALES BY GNFC

The Gujarat Narmada Valley Fertilisers Company at Bharuch has recorded an all-time high in its production as well as sales during July 1986 and June 1987.

According to a GNFC release, production of ammonia at 4,12,624 tonnes, methanol at 21,806 tonnes, and Narmada urea at 6,10,176 tonnes recorded an all-time high.

Despite the severe drought situation and glut of fertilisers, the sales of fertilisers increased from 7.68 lakh tonnes last year to 8.70 lakh tonnes this year, while the sale of Narmada urea was 6.53 lakh tonnes against 5.95 lakhs tonnes last year.

During 1986-87 GNFC had also made available 22,029 tonnes of methanol and 61,033 tonnes of liquid ammonia.

GNFC's turnover was Rs. 344.21 crores against Rs. 304.46 crores in the period under review and it has achieved a notable gross profit of Rs. 68.47 87. The net profit amounted to Rs. crores from its operation during 1986-18.67 crores after providing for depreciation of Rs. 46.30 crores.

GAS — BASED POWER PLANT FOR ASSAM CLEARED

The Union Cabinet has cleared the 280-MW gas based power plant for Kathalgudi in Assam. The project will be set up with Japanese assistance and is expected to be ready by 1991.

The Japanese have agreed to provide financial assistance of 30 billion yen for the project. In fact, an agreement to this effect has already been signed by the Indian and Japanese governments.

An Indian delegation is expected to leave for Japan soon for seeking an additional assistance of nine billion yen.

The overall cost of the project is expected to be around Rs. 500 crores of which Rs. 305 crores will be provided by the Japanese. The balance will be raised indigenously.

To be run under the Central sector, the project will be implemented by the North Eastern Electric Corporation. The power plant will use natural gas provided by Oil India Limited.

FIRE IN MRL

A fire broke out in the old crude distillation unit of Madras Refineries (MRL) in Manali recently.

The fire caused by the leak in one of the pump seals was put out after two hours by the MRL fire fighting units with assistance from the Tamil Nadu fire service and the Madras Fertilizers Limited.

No one was injured due to the fire and the product supply from MRL would continue uniterrupted, a press release from MRL said. The affected unit would be back on stream within a few days, it added.

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Environment protection law impractical : Industry

The measures for the preservation of the environment starting with the enforcement of the Environment Protection Act, 1986, and its subsequent amendments, can hardly be described as "pragmatic" and are bound to hinder industrial production and restrict the growth of backward areas, according to industry circles at New Delhi.

Industry has roundly criticised the standards for emission or discharge of pollutants in respect of eleven industries as "too stringent" and difficult to achieve in practical terms.

The eleven industries are caustic soda, MNM (synthetic) fibres, oil refineries, sugar mills, thermal power plants, cotton textiles, composite woollen mills, dyes and dye intermediates, electroplating industry, cement plants with a capacity of 200 tonnes a day or more and stone crushing units.

In order to ensure effective compliance, industry has called for phased introduction of pollution control measures in view of paucity of resources and technological inputs.

The high capital intensity of equipment necessitates the provision of financial assistance and loans by state governments for purchase and installation of pollution control equipment. Industry has sought supporting facilities from government agencies and municipalities like adequate power and water supply and standard quality of coal for effective pollution control. It considers imperative the need to ensure uninterrupted power supply for effluent treatment plants.

In a note to the ministry of environment and forests, the PHD chamber of Commerce and Industry has suggested that the Central and state pollution control boards should enlarge their area of operation to provide advisory and technical services to industries and prepare model schemes for implementation of standards and pollution control. At present, the boards are entrusted with the main task of enforcing pollution standards laid down for industrial units

The chamber feels that assistance could be provided by the boards in matters like location of industries, appropriate technology for taking up pollution control, collective action for common effluent treatment and disposal, and liaison with the municipal authorities for solving related problems.

Industrial units have expressed concern over how provisions of the tighter Air (Prevention and Control of Pollution) Act, 1971 will be implemented. An amendment bill moved in the Lok Sabha seeks to arm Central and state pollution control boards with more powers and provides for more stringent punishment for violating the provisions of the act. The boards are being empowered to order closure of any industry, operation or process.

The bill seeks to allow any person to move the courts for violation of the act after giving due notice to the boards.

It is felt that instead of launching criminal proceedings against industrial units it may be advisable to have mutual discussions and consultations to sort out problems.

The PHD chamber feels that lack of co-ordination among the various enforcing authorities, little technical knowledge and improper under-standing of various regulations as well as non-availability of equipment needed are some of the constraints in the way of proper implementation of the Factories Amendment Act, 1986.

Industry has voiced concern that while certain rights of workers to safety have been laid down in the Act, no corresponding responsibilities on the part of the authorities have been prescribed.

GUJARAT STEP AGAINST COASTAL POLLUTION

The Gujarat Pollution Control Board has started coastal monitoring to cover the State's 1600 km long coastline to overcome the problem of pollution caused to marine life due to seaside industries or in the esturine region of the rivers.

The Union Ministry of Environment and Forests has agreed to finance the project, the overall cost of which will be about Rs. 30 lakhs per year. The project is being implemented by the Board in co-operation with the National Institute of Oceanography.

To carry out effective monitoring of coastal waters and prevent damage to sea animals, six stations have already been set up along the Saurashtra coast.

S. CHELIHA TO HEAD OIL

With the selection of Mr. S. Cheliha for the post of Managing Director-cum-Chairman of Oil India Ltd. (OIL) the uncertainty gripping the organisation for the last two months, after the exit of Major General. C. N. S. Jattar, is expected to end.

Mr. Cheliha, who is at present Director, Exploration and Development with OIL, was in the race for this coveted post along with six others including two from his own organisation — Dr. P. Bharali (Director, Operations) and Mr. Rajeshwar Prasad (Director, Finance).

The other aspirants were two high-ranking serving army officials — Mr. C. K. Baruah, a group general manager with Oil and Natural Gas Commission (ONGC), and Mr. B. N. Dutta, a general manager with Indian Oil Corporation.

Mr. Cheliha's name has been recommended by the Public Enterprises Selection Board and his appointment is expected to be formalised shortly.

Meanwhile, official sources in New Delhi have clarified that the move to shift the headquarters of OIL from New Delhi to Duliajan in Assam will hardly affect 10 people — CMD, the four directors and the officials who report to them directly such as geo-scientific advisor, planning advisor and the chief vigilance officer. The rest of the staff will be allowed to stay in New Delhi.

MRL DIVIDEND

Mr. Joseph Kurian, Chairman and Managing Director, Madras Fertilisers Ltd. (MFL) Madras, presented a cheque for Rs. 1,38,27,600 to Mr. R. Prabhu, Union Minister of State for Fertilisers, towards dividend on equity share capital held by the Government of India in MFL for the year 1986-87.

The highlights of MFL performance during the year were highest turnover Rs. 237.06 crores; capacity utilisation 104 per cent; production 7.17 lakh tonnes; Sales (including pool fertilisers) 8.18 lakh tonnes; Profit after tax Rs. 6.64 crores; contribution to national exchequer Rs. 31.39 crores

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COMPANY NOTES

Punjab Alkalies

The state-owned Punjab Alkalies and Chemicals Limited (PACL) has achieved yet another milestone with the successful completion and trial runs of its Rs. 4 crore caustic flaking unit within the stipulated schedule.

The commercial production of this highly contemporary flaking plant which is based on the technology of Bertrams of Switzerland went on stream recently.

The flaking unit, which has a production capacity of 50 tonnes per day is designed to meet the requirement of Punjab, Himachal Pradesh, J. and K, Western U.P. Delhi and Rajasthan on the one hand provided flexibility in the product mix and production planning.

According to a PACL press release this caustic flaking unit will utilise the Bertrams technology and will facilitate concenration of caustic soda lye from 47 per cent.

The plant design provides for enhancing the capacity by 80 per cent through the installation of an intermediate evaporator. This unit will also facilitate the use of hydrogen, a by-product, as a fuel in the electrolysis cell process, which was hitherto let out in the air.

PACL which commissioned its Rs. 31.25 crore caustic soda plant of 100 tonnes per day capacity in January 1984, has thus implemented its first phase of expansion with the going on-stream of the flaker unit. PACL has a licensed capacity to produce 16,500 tonnes per annum of liquid chlorine, 26,400 tonnes per annum of hydrochloric acid and 1000 tonnes of bleach liquor.

The capacity utilisation of the plant has been steadily built up to 80 per cent and it netted a cash profit of Rs. 465 lakhs in its three and half years of operation.

GUJARAT NARMADA FERTILISERS

Gujarat Narmada Valley Fertilisers Co. Ltd. (GNFC) has recorded an all-round increase in the production and sales during the year ended June 1987, and the directors have proposed to maintain the equity dividend of 18 per cent.

The company's turnover has risen by 13 per cent to Rs. 344.21 crores compared with Rs. 304.46 crores in the previous year. This is despite market convulsion resulting from heavy imports and poor offtake of fertiliser due to successive monsoon failure.

The increased turnover was the direct result of GNFC decision to reduce the inventory cost in the face of severe drought, market glut, large-scale fertiliser imports and awried fertiliser consumption projection of government. For the purpose, higher discounts had to be offered to dealers in line with other urea manufacturers while ensuring better liquidity.

During the year, the company has earned a notable gross profit of Rs. 68.47 crores from its operation. The net profit amounts to Rs. 18.67 crores after providing for depreciation of Rs. 46.30 crores. There is probable income tax liability of Rs. 3.50 crores.

During the year, the company produced 4.13 lakh metric tonnes of ammonia, registering record capacity utilisation of 92.62 per cent. Similarly, the methanol plant achieved a capacity utilisation of 109 per cent and that of urea plant 103 per cent, depicting over 100 per cent capacity utilisation consecutively for two years.

SHRI AMBUJA PETROCHEM

Shri Ambuja Petrochemicals Ltd. has fared well during the year ended June 1987 inspite of 60 per cent power cut imposed for the first time in Andhra Pradesh for four months. The power cut restricted the production of pthalic anhydride to 7,520 tonnes against 8,910 tonnes produced in 1985-86. The sales during the year, however, were 8,325 tonnes against 8,021 tonnes. Owing to the cripping power cut, it lost around 1,400 tonnes of production.

Based on capitalisation of interest on long-term loans, the gross profit before interest and depreciation during the year amounted to Rs. 336.24 lakhs with a cash profit of Rs. 227.11 lakhs, and a net accounting profit of Rs. 121.82 lakhs compared to Rs. 319.59 lakhs, Rs. 226.87 lakhs and Rs. 129.73 lakhs for last three year's respectively.

To meet its power requirements, it has installed a 1000 KVA diesel generating set and has placed an order for another set of the same capacity to function as 100 per cent standby. With these sets in operation, the company will avoid any production loss owing to power cut.

It had already completed the modernisation programme and has a new catalyst and is using a high efficiency heat

hich will considerably improve
e performance.

The performance during the
st three months of the current
ear is significantly better. The
rnover for these three months
around Rs. 5 crores compared
Rs. 3.6 crores for the corres-
onding period last year.

During the year, it exported
987 tonnes of phthalic anhydri-
e, earning Rs. 62 lakhs in for-
gn exchange. It plans to ex-
ort around 2000 tonnes in the
urrent year and is expected to
arn Rs. 1.5 crores.

S. 100 CRORE NEW ROJECTS BY KANORIA HEM

The company, in spite of its
emonstrable strength in chemi-
als and cotton and jute textiles,
as all these years maintained a
udied "low profile". As Mr. S.
. Kanoria, chairman and mana-
ing director, told this corres-
ondent, the management spent
onsiderable time in the last few
ears in firming up new projects
nd deciding the areas where
xisting capacities should be ex-
anded. The investment pro-
ammes of Kanoria Chemicals
the next few years are over
s. 100 crores.

The most ambitious of all Ka-
oria Chemicals projects in hand
lates to the manufacture of
olypropylene, a versatile plastic
aterial. For implementing the
. 75-crore polypropylene pro-
ct, Kanoria Chemicals, along
th Pradeshiya Industrial and
vestment Corporation of U.P.
d., (PICUP), has promoted Po-
propylene India Limtied (PPIL).
Engineering know-how and
rvices for the project will be
ailable from Solvay and
E of Belgium. Solvay, which
ppens to be the 25th largest
emical company in the world,
over Rs. 7,500 crores, has agreed to provide the state-of-the art technology to PPIL to make homo and random copolymers of propylene. The necessary collaboration agreements have recently been signed.

Mr. Kanoria says that Solvay had agreed to participate in the equity capital of PPIL to the extent of 11 per cent. "This can be taken as a commitment by the Belgian company to transfer technology on a continuous basis. The close association with Solvay will also enable PPIL to render excellent service to consumers", he said.

Being in the assisted sector, the UP government undertaking PICUP, will have a 11 per cent share in PPIL equity capital. The private sector promoter, Kanoria Chemicals, will be subscribing to 30 per cent of the capital. The remaining 48 per cent of PPIL's equity capital will be offered to the public.

The 30,000 tonne poiypropylene project of PPIL, to be located at Mathura, is scheduled to go on stream by the middle of 1990 and the promoters propose to raise capital from the maket when the project is about to be commissioned.

Polypropylene, which finds major applications in packaging woven sacks, monofilaments and injection moulding will continue to remain in short supply in our country. According to the working group on petrochemicals, against the anticipated demand for 2,86,000 tonnes in 1994, the domestic production will be 1,15,000 tonnes, including that of PPIL. The company will get the principal raw material propylene from Indian Oil Corporation's Mathura refinery.

At its existing chemicals complex at Ankleshwar, Gujarat, Kanoria Chemicals is putting up plants at an investment of Rs. 15 crores to manufacture acetaldehyde and formaldehyde. While production of acetaldehyde will start early next year, the formaldehyde output will begin in the latter part of 1988.

Membrane technology

To Kanoria Chemicals, said Mr. Kanoria, would go the distintion of being the first unit in the world to use membrane technology for the manufacture of Pentaerythritol. The membrane technology is being adopted as the capacity to make Pentaerythritol is being expanded from 1,200 tonnes to 3,000 tonnes a year. The application of this technology will enable Kanoria Chemicals to make high-grade Pentaerythritol, which is needed for making explosives. It also has many strategic defence applications. The chemical is presently imported.

Asahi Glass of Japan has supplied membrane technology to Kanoria Chemicals, which is investing Rs. 6 crores for the capacity expansion of Pentaerythritol. The expanded capacity will be commissioned shortly.

Nylon castings

The chairman has informed that Kanoria Chemicals had set up a subsidiary company called Kanoria Alkalies and Plastics Ltd. which, by teaming up with a British company would be making nylon castings for the first time in the country. The nylon castings would replace non-ferrous metals in various industrial uses.

The British company will have financial participation in Kanoria Alkalies. The plant is being located at Shahidabad, near Delhi. It is likely that once this project goes on stream, the compa ny will diversify into other engineering plastics.

Mr. Kanoria has ruled out the possibility of the company expanding the caustic soda manufacturing capacity, since he believes that there is already enough capacity in the country. At its Renukoot complex, the company has a capacity to manufacture 33,000 tonnes of caustic soda a year. Besides caustic soda, the company manufactures pesticides and stable bleaching power at this complex. Mr. Kanoria took pride in the fact that since the start of the complex 23 years ago, the Renukoot complex, employing about 1,000 workers, had not lost one single man hour because of any industrial relations problems.

In the manufacture of caustic soda, Kanoria Chemicals has an advantage over other producers since it draws hydel power at the point of generation, thereby avoiding the cost of transmission and distribution.

Anil Synthetics

In the seven years since its take-over, Kanoria Chemicals has invested over Rs. 7 crores on the modernisation of the textile plant of Anil Synthetics at Ahmedabad. A division of Kanoria Chemicals, the turnover of Anil Synthetics in 1986-87 is estimated at Rs. 18 crores. The turnover of the textile unit should rise to Rs. 25 crores by 1988-89. Since its take-over, the unit value of cloth produced by Anil Synthetics has risen from Rs. 6 a metre to Rs. 15 a metre.

Kanoria Chemicals controls Ludlow Jute Mills through one of its subsidiaries. The company created a sensation in corporate circles when it managed to acquire the jute mill from American owners in the late seventies. The mill has a capacity to produce 30,000 tonnes of jute goods, including speciality products and high quality yarn.

The turnover of Kanoria Chemicals, which should be around Rs. 60 crores during 1986-87 is expected to cross the Rs. 100-crore mark in 1988-89 by which time the company will get the benefits of proposed expansions and diversifications. The turnover of the subsidiary company which owns the Ludlow Jute Mills is around Rs. 25 crores.

Kanoria Chemicals has a subscribed equity capital of Rs. 2,69,41.000 in 26,94.100 equity shares of Rs. 10 each. The company had reserves of Rs. 18 crores on June 30, 1986. It is therefore, well placed to make a bonus issue by capitalising a part of its reserves.

ITALIAN FIBRES INDUSTRY LACKLUSTRE

Following a stagnant first quarter, Italy's chemical fibres industry is unlikely to show much improvement for the rest of 1987. According to the Italian industry board, Confindustria, fibres output is likely to drop by 0.2 per cent in both the second and third quarters of 1987 following a 0.1 per cent fall in the first quarter.

Exports are likely to drop by 2 per cent in the April-June quarter following a 1 per cent dip in the first three months. But the industry board is predicting an even larger drop of around 4 per cent for this quarter.

Only orders seem to be showing improvement, with a 2 per cent lift expected for this quarter, reflecting a continued increase of foreign orders which are more than compensating for a tail off in domestic demand. Confindustria says that the negative trends in the fibres industry is linked to imports from non-EEC countries of both fibres and textiles. It is confident, however, that if the EEC implements recent anti-dumping recommendations, the market will stabilize.

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SPOTLIGHT ON

Biotechnology & Life Sciences (Part 2)

GENETIC MODIFICTION OF EUROPEAN HOP YIELDS FIVE SUPERIOR DISEASE-RESISTANT HOPS

An European hop, known as Hallertauer Mittelfruch, was once prized for the flavour and aroma it gave to beer. But during the past 20 years, the hop has fallen victim to the fungal disease verticillium wilt and has virtually disappeared from world markets. However, biotech research has come to the rescue of the beer industry. A genetically modified Hallertauer Mittelfruch has been crossed with other European hops to give five new selections that are high yielding and disease-resistant, reports Alfred Hannold, a Plant geneticist with the U.S. Department of Agriculture's (USDA) Agricultural Research Service (Corvallis, Oregon). Within the coming three years, US hop growers could be harvesting one or more of the selections.

This success has created a major economic revolution in hop cultivation. The homegrown Hallertauer will cut US hop imports -- which total around 15 million lb/year -- in half and bring Northwest hop growers an additional $15 million annually, reports USDA. Further, three major US brewers have already shown interest in the Hallertauer selections, besides two major breweries from Japan. (*Chem. Wk.* 5/27/87 p. 34).

A MICROBIAL APPROACH TO KEEP STORED FRUITS FRESH & HEALTHY MOOTED BY USDA

It is estimated that up to 20% of the US fruit is damaged after harvest mainly by fungi and yeast. In semi-tropical and tropical countries of the Third World this loss may be as high as 50% due to tropical climate and improper storage. This costs the world over, loss of several millions of dollars each year. Although chemicals that kill these organisms (fungi and yeast) prevent losses from being higher, such chemicals can pose environmental and safety concerns.

Now, however, a biological approach to controlling the organisms has been developed by USDA researchers, working under plant pathologist Charles L Wilson at USDA's Appalachian Fruit Research Station (Kearneyville, W. Virginia). Wilson has isolated bacteria and yeast like organisms that kill the harmful fungi and bacteria and thus keep stored fruits healthy. The beneficial organisms work in many directions. Some produce chemicals similar to antibiotics that kill the harmful organisms. Other eat nutrients on the fruit surface to starve the harmful orgnisms. An example is the soil bacterium Bacillus subtilis which Wilson has patented for control of Brown Rot Fungus, the number one disease of picked stone fruits, such as peaches and plums. The bacterium works primarily by producing an antibiotic, that kills or prevents the growth of the fungus. (*Chem. Wk.* 5/27/87 p. 34)

ENZYMES HARNESSED TO SYNTHESIZE COMPLEX ORGANIC MOLECULES FROM SIMPLE STARTING RAW MATERIALS

Researchers in enzyme chemistry recently unveiled a new development in enzyme synthesis at the recent Congress on Enzymes. A new trend in enzyme based synthesis is towards the use of enzymes to produce synthesis from simple starting materials. Site-directed mutagenesis of the genes for some enzymes is being used to improve their performance. Polyketide synthase takes small molecules like acetate and malonate and assemble them into much larger polyketone structures which are then converted to antibiotics such as tetracycline and erythromycin. (*Chem. Ind.* 5/4/87 p. 309)

DNA PROBES FOR DIAGNOSING CANCER ON THE HORIZON

US patent approval has been granted on technology covering DNA probes that detect chromosomal translocations associated with the activation of oncogenes, the family of genes whose abnormal expression can cause cancer.

Oncogene Science (Manhasset, N.Y.) and Gen-Probe (San Diego) will share a co-exclusive license on the technology covered by US Pat. 4,681,840. Oncogene now has in clinical trials a diagnostic test based on the technology. It identifies a spacific chromosomal rearrangement associated with chronic myelogenous leukaemia. On long term basis, the technology may have application in diagnosing more common cancers such as those of the lung, breast and colon. (*Chem. Wk.* 7/29/87 p. 17)

A FASTER FERMENTATION ROUTE TO SAKE DEVELOPED IN JAPAN

Batch fermentation to brew sake usually takes 25 days. To maintain constant shipments, modern large lume sake producers operate ndreds of fermenters. Now, a ajor japanese sake house, Osaki ake Brewing (Nishinomiya, yogo), plans to reduce the produc- n period to two days by continu- sly brewing with immobilised ast. The company expects to put t the new product with 12-13% cohol content. Most brands of ke, a beer often erroneously called wine, have alcoholic contents of %.

Ozeki plans to have its new off- ing on the market next spring 988) and is slated to install a 00,000 'bio-sake' system, includ- g a 500-litre fermenter, at Nish- miya in September 1987. xperimental fermentation is pected to last 6 months. If every- ing goes well, Ozeki will use the ame facility for commercial opera- ns. With the new equipment, the mpany will try to determine if it can oduce glucose from rice starch d syrup in one day and ferment e syrup in another day. The bio- ke would be stored for a few days efore the yeast is recovered in a ntrifuge. The yeast life is esti- ated at 6 months. The bio-sake's wer alcohol content is not a prob- m. The advertising campaign is ely to stress the products 'soft feel- g'. (*Chem. Wk.* 7/29/87 p. 17).

JOINT VENTURE FINALIZED MONOCLONAL ANTIBODIES U.S.A.

Dartmouth Medical School (Han- er, N.H.) has entered into its first mmercial joint venture. The school s teamed up with Essex Chemi- l (Clifton, N.J.) to form Medarex, health care company that will mmercialize Dartmouth's proprie- y biotech developments. Meda- x's technology centres on rtmouth's monoclonal antibodies at bind to monocytes and macro- ages, the cells that the body uses to kill foreign cells.

Medarex plans to conjugate those antibodies with monoclonals that bind to tumours or other harmful cells, thereby developing specific therapeutics based on the body's own immune system.

Medarex plans to license and market diagnostic and therapeutic products. It also plans to enter into ventures with companies having technologies that Medarex believes will be synergistic with its own know-how. (*Chem. Wk.* 7/29/87 p. 17).

A COMBINATION OF RECOMBINANT DRUGS UNDER CLINICAL TRIALS TO FIGHT CANCER

Cetus (Emeryville, Calif.) Company has entered a combination of genetically engineered analogues of interleukin-2 (IL-2) and tumour necrosis factor (TNF) into clinical trials against a broad range of cancers. When used together, the compounds may have a synergistic effect on a variety of tumours, reports Cetus researchers. In fact, preclinical studies have shown that the combination is effective against tumours that have responded poorly to either drug alone. Initial studies will take place at Alta Bates Hospital (Berkeley, Calif.) although Cetus plans additional trials of TNF and IL-2 and trials of TNF with existing chemotherapeutic drugs. (*Chem. Wk.* 7/29/87 p. 17).

TRACKING THE RELEASE OF GENETICALLY ENGINEERED MICROORGANISMS.

Accurate monitoring of genetically engineered microorganisms that are released into the environment is the goal of $607,000 research agreement between Monsanto and Clemson University in South Carolina, USA. Clemson will field-test a Monsanto developed tracking system that consists of the soil bacterium Pseudomonas fluorescens so engineered that its distribution and survival in the soil can be determined. Normally P. fluorescens cannot metabolize the sugar lactose. But Monsanto engineered the organism to utilize lactose, thus providing a way to identify it among the multitude of native bacteria found in the soil. The engineered P. fluorescens also contains markers for fluorescence, colour and resistance to the antibiotic rifampin. Field tests will run for 18 months and will consist of applying the organism to the soil when wheat is planted, then monitoring its growth, distribution and survival. Both the Environmental Protection Agency and the US Department of Agriculture will approve the test. (*Chem. Wk.* 6/24/87 p. 18).

BIOTECHNOLOGY SPAWNS A NEW LANDMARK IN VIT. C SYNTHESIS

Till recently, ascorbic acid (Vit. C) has been made commercially by a chemical process (Richstein process) in the main with a single biotransformation (the conversion of D-sorbitol to L-sorbose by Acetobacter organisms) as a key part. Some recent development indicate that Vit. C may become the first example of a bulk chemical to be manufactured by the application of genetic engineering. Conversion of glucose, the starting material for current Vit. C production, to 2,5-diketo-D-gluconic acid may be achieved using an Ervinia bacterium. This latter compound may, by utilizing a Cornybacterium, be converted to 2-keto-L-gluconic acid, the precursor to Vit. C in the current process. The whole pathway has recently been engineered into an Ervinia Specie's.

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Genetic Engineering may therefore produce a near revolution in the commercial production of Vit. C. This revolution can bring down the cost of production of this essential vitamin substantially in future and make way for its extensive use in foods, medicine and industry. (*Lab Practice* 7/1987 p. 46).

GENETIC FINGERPRINTING SERVICE ON THE HORIZON

The world's first ever laboratory to offer a service for people wanting to know the genetic relationship between individuals opened for business in Britain in July 1987. The laboratory uses a technique called 'genetic fingerprinting' developed by scientists at the University of Leicester. This technique distinguishes between individuals whether they are human or animals, and can determine the parantage of children.

ICI, the company that has bought the rights to the technique, has formed a new company, called 'Cellmark Diagnostics' to run the laboratory at Abington, near Oxford (UK). It can test 250 blood samples a week by genetic fingerprinting. The ICI is planning to open the worlds second laboratory at Maryland, USA to provide the same service in the New World.

In genetic fingerprinting, scientists extract genetic material, DNA, from the sample of tissue, whether it is blood, semen, skin or the root of a hair. They add proper enzymes to the DNA that chop it into tiny pieces of unequal size. They then put the fragments into a gel, and an electric field separates the larger DNA fragments from the smaller ones.

The scientists then transfer the DNA from the gel to a nylon membrane by a process called Southern blotting -- the fragments of DNA move from the gel to the membrane as the solution of DNA is drawn up by capillary forces created by blotting paper placed on top of the nylon membrane. The position of the DNA fragments in the nylon membrane exactly matches their position in the gel.

The next step is to add tiny pieces of DNA that are radioactively labelled. These DNA 'probes' are built to identify regions of DNA known as hypervariables. The researcher Alex Jeffreys of the Leicester University (who discovered and developed DNA fingerprinting) reports that people are unique in terms of the distribution of hypervariables in their DNA. A child will share some of its hypervariables with its biological mother and some with its father.

After washing the nylon membrane, the only radioactivity left will be the probes that have stuck to hypervariable regions. Put the membranes next to x-ray film, and dark bands will appear where the probes have stuck to these regions. The distribution of the bands is unique to an individual and a child's 'genetic fingerprint' will be an amalgam of the fingerprints of its two parents. The method can determine paternity in both animals and humans.

The scientists at Cellmark report that they have analysed blood stains that are three years old, and were still able to test for genetic fingerprints. In theory, there could be no limit on how old the tissue has to be for analysis.

The Immigration & Naturalization Department of Britain is already using the technique to resolve questions over the relationship between legal immigrants and their alleged family who want to live in Britain. The police in the UK are also studying the technique with a view to using i for confirming whether a suspec was at the scene of a crime. Anima breeders want to use it to guarantee the pedigree of farm and domestic animals. (*New Sci.* 7/23/87 p. 30).

WEST GERMAN BIOTECH INSTITUTE INAUGURATES SIX WEEK PROGRAMME TO TRAIN THIRD WORLD SCIENTISTS IN BIOTECH METHODOLOGY

Twenty scientists from Third World countries will be trained in 1987 for a period of 6 weeks in biotechnology at the International Training Programme in Biotechnology in West Germany at Gesselschaft fur Biotechnologische Forschung (GBF). Their training will be organized by Dr. Joachim Klein, director of GBF.

The aim of the six-week inaugural programme is to give scientists from developing countries advanced training in advanced biotech methodology. Participants will be given both instruction and 'hands on' experience to enhance their ability to contribute directly to biotech programmes in their home countries and to train others locally. The instruction will be only in the English language as English now is the international language of science.

The 20 scientists attending the inaugural course have been chosen on merit from some 200 who applied. They come from Argentina, Brazil, China, Columbia, Ghana, India, Indonesia, Kenya, Malaysia, Nepal, Nigeria, Pakistan, the Phillippines, Thailand and Venezuela.

The GBF is a leading research institute in biotechnology and allied sciences in West Germany with a staff of nearly 400. It is located in a suburb of the university town of Braunschweig, some 40 miles east

Hanover. Its research interest
lude production of microbial pro-
cts and biotransformation molec-
r biology of biologically active
teins, technical enzymes and pro-
n design, and development of bio-
h processes. GBF is also
ponsible for the German Collec-
n of Microorganisms, known
nply as DSM (for Deutsche
mmlung Von Microorganismen).
is entails collecting microorga-
ms of scientific and technical
portance, classifying them and
nserving them, without altering
ir properties. (*C & EN* 3/30/87 pp
-18).

INSECTICIDE GENE CENSED BY AGRACETUS

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ernative to pesticides has been
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sconsin, USA) from the Washing-
Research Foundation, the licens-
agent for the University of
ashington, Seattle. The gene
des for a toxin synthesized by the
cterium Bacillus thuringiensis (BT)
at is specific to caterpillars.

Agracetus plans to use the gene
develop insect resistance in such major crops as cotton and corn. It also will sub-license other uses of the technology. Non-recombinant forms of BT pesticides have been used in the USA since 1961. (*C & EN* 6/24/87 p. 18).

A NEW ROUTE TO CHEAPER FERMENTATION FUEL

The use of ethanol and methanol as fuel has proved expensive. Therefore, Prof. R. Thomas Myers, of Kent State University, Ohio, USA has suggested butyl alcohol as an economic alternative. It has been known for a long time that certain organisms will produce butyl alcohol (*Ind. Eng. Chem.* **44**, 1677 (1952)) as the main product of fermentation (along with acetone and other organics). Such organisms can be harnessed to produce butyl alcohol efficiently by a biotech process.

The outstanding advantage of this procedure is that butyl alcohol produced can, by countercurrent extraction, be transferred from the aqueous fermentation medium directly into the hydrocarbon fuel. The distribution coefficient are quite favourable (Meyer, K.H., Hemmi, H., *Biochem.* 2, **277**,39, 1935) and the concentration of butylalcohol in the hydrocarbon will be high. There will be some water carried along with the alcohol but it can be removed from the concentrated solution, by the procedures, such as use of molecular sieves. (*C & EN* 9/23/85 p. 24). The dried solution can then be diluted to the desired concentration with more gasoline.

There is no energy required for the extraction process, except for pumping. There are also other advantages to butyl alcohol as a blend with gasoline, (perhaps called in future as Butagas). Butyl alcohol has a higher heat of combustion per litre, its vapour pressure is much lower, it has less tendency to absorb water from the air, it is more soluble in gasoline and research (*Hydrocarbon Process* **55(7)**, 121, (1976) indicates that it will give higher octane number, increased power, reduced fuel consumption and carbon monoxide emission. Therefore, according to Prof. Myers, it should be possible in future with modern biotech method to develo microorgaisms that will not only produce more butyl alcohol in absolute amount, but give a higher ratio of butyl alcohol to other organics, which are less soluble in the hydrocarbon phase. (*C & EN* 3/23/87 p. 3, 88).

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an introduction to the paint industry

DEREK EDDOWES*

(Reproduced from **'SHELL PETROCHEMICALS'** No. 5, 1987)

he paint industry is a major outlet or chemicals in the form of resins, olvents and pigments. This article ets the scene for a series in which ve plan to look at the principal end uses for paint -- such as in cars, air-raft and ships; for maintenance; in he home; and in numerous general ndustrial applications.

Paint can conveniently be defined s a fluid material which, when pplied to a surface in a thin layer, roduces a solid, adherent and ohesive film. 'Adherent' means the bility of the paint film to stick firmly o the surface to which it is applied, and 'cohesive' implies that the com-onents of the film itself stick ogether. This definition covers a vide range of paint systems, includ-ng highly mobile products at one nd of the spectrum through viscous naterials to powders.

Paints can be characterised in a umber of ways. A convenient pproach is by the way in which they ry, or set to form a solid film. Some, uch as nitrocellulose lacquers, dry olely by evaporation of the solvent omponent. Most, however, set by neans of a chemical reaction. Typ-cally, oxygen from the atmosphere eacts with drying oils, setting off a eries of complex reactions leading o polymerisation. The adsorption of noisture from the atmosphere is nother mechanism by which some aint systems dry. Films can also set s a result of chemical reactions etween components of the paint. The latter route includes radiation-curing techniques such as those based on electron-beam and ultraviolet radiation.

RAPID DEVELOPMENT

The modern paint industry had its beginning some 60 years ago. Its rapid development since then from a traditional industry to one that has become highly sophisticated, both technically and structurally, arose from two inextricably linked factors. One was the burgeoning of a host of organic chemical products and the other was the ever-increasing demands made on surface coatings by industries which required fast-drying, durable materials with which to protect and decorate their products.

Although there have been many notable contributions to the paint industry in respect of organic and inorganic pigments, it is the binder which has been most developed in recent years. Alkyds, still the major component of binders in solvent-based decorative and industrial paints, were discovered in 1901 by reacting phthalic anhydride and glycerol. The products were rather intractable for paint-making because they were insoluble in drying oils.

This problem was overcome a few years later, but it was not until the mid-1920s that commercial products became generally available. The reason was simple. Progress depended on the development by the chemical industry of a practicable method of manufacturing phthalic anhydride. Further, glycerol was in the early days derived as a by-product of the soap and fat-splitting industry; it is now also synthesised from propylene.

A MAJOR INDUSTRY

The paint industry is today very large. World production is estimated to be well over 17 million tonnes annually, with Western Europe and North America each accounting for about 30%, Eastern Europe for 25% and the Far East (mainly Japan) for some 10% of the market. The markets vary according to the degree of industrialisation. In the UK, for instance, the decorative sector accounts for roughly one-half of total production. Of the remaining 50%, about 24% goes to general industrial finishing, 6% to original automotive finishing, 7% to vehicle refiishing, 1.5% to marine applications and 11.5% to export. The breakdown in the USA is similar, just over one-half of production being designated architectural and the remainder being classified as either for original equipment manufacture (OEM) (about 29%) or for special-purpose coatings (19%).

Because of the different statistical bases used in the USA and in the various Western European countries, it is not possible to make a direct comparison of end-uses for paint. Taking the Western European market as a whole, architectural (decorative) coatings account for about 48% of total paint usage. Original vehicle finishing accounts for some 5% of the total, with rather less for refinishing; about 8.5% for wood finishing; 6% for coil & strip coating; 3% for marine applications (e.g. anti-fouling and anticorrosive); about 3%

The author was for many years editor of *Polymers Paint Colour Journal'*. **Address: 4, astlemaine Avenue, Ewell, Epsom, urrey KT17 2RB, England.**

for powder coatings; and the remainder (22-23%) for general industrial finishing. These figures, of course, vary from country to country. These divisions are a good indication of the range of end-uses to which paint is put, as listed in Table-1. The third category -- special purpose coatings -- cuts across the other two sectors.

THE LINK WITH CHEMICALS

Paints were at one time based solely on oleoresinous varnishes made by reacting vegetable oils with natural gums and resins such as rosin and copals. The growth of the chemical industry in general and of petrochemicals in particular gave a tremendous impetus to the development of the binder, or resin, component of paint systems. Some of the more common types of resin are listed, together with their chemical precursors, in Table-2.

The paint industry also relies heavily on the petrochemical industry for solvents. These include hydrocarbons such as white spirit, xylene, alcohols such as butanol and ethanol, glycols, esters (e.g. ethyl acetate and butyl lactate) and chlorinated solvents (trichlorethylene, for instance). Various proprietary hydrocarbon mixtures are also available.

Many other chemicals are also used in paint formulation. They include fungicides; bactericides; driers to accelerate the setting of oil-based coatings; protective colloids used to give structural coherence to water based paints and thus to stabilise the dispersed polymer and pigment particles; antifoaming agents; coalescing agents to assist film formation in water-based systems; and so on.

It is not possible to cover such a vast range of complex products here, but a good idea of the ubiquity of the modern paint resin industry can be gauged by looking in more detail at three of the most importnt types - alkyds, epoxys and resin dispersions.

ALKYD RESINS

Alkyd resins are the work-horses of the paint industry. They are based essentially on the reaction product of an organic acid or anhydride (usually phthalic anhydride) and a polyhydric alcohol (e.g. glycerol or pentaerythritol), modified with a fatty acid and -- especially for industrial finishes -- styrene, vinyl toluene or methacrylates. The latter ingredients enhance such properties as drying speed and hardness. Overall, the possible permutations and combinations are legion.

Most solvent-based gloss paints rely on alkyds. The aim in this case is to make a product with good brushing, flow and levelling properties, coupled with elasticity, hardness and durability. It is acceptable if the product dries overnight. Typically, a 'long-oil' akyed is used, which means that the oil content, expressed as a percentage of fatty acid in the resin, is about 45-75%. Such a resin is soluble in white spirit.

Fatty acids used in the manufacture of decorative alkyds include tall oil fatty acids (derived as one of the by products from the manufacture of paper from wood by the sulphate process); and linseed oil and soya

TABLE-1. END-USES FOR PAINT

Architectual coatings	**OEM coatings**	**Special-purpose coatings**
Exterior house and trim	Automotive, truck and bus	Maintenance
Exterior masonry	Rail vehicles	Automotive repair
Undercoats, primers and sealers	Aircraft and missiles	Marine refinish
Interior walls, ceiling and trim	Marine	Traffic (roads)
Varnishes and stains	Wood furniture and fixtures (including factory-applied)	Roof paints
	Domestic and business appliances	Metallic paints
	Electrical and electronic (including coils)	Aerosol-applied paint
	Machinery and equipment	
	Containers and closures	
	Paper and board, Pipes	

TABLE-2. SOME COMMON PAINT RESINS

	Chemical precursors
Alkyd	Glycerol, pentaerythriol Phthalic anhydride A veriety of vegetahle oils and derived fatty acids Polymethacrylic esters, phenol, vinyl toluene, styrene, polyamides
Phenolic	Phenols, cresols, xyelenols, formladehyde
Nitrogen-based	Urea, melamine formaldehyde, butanol
Epoxy	Epichlohydrin, bisphenol A, amines
Urethanes	Polyols (e.g. pentaerythritol, butane diol, hexane diol) di-isocyanates
Vinyl and acrylic	Vinyl acetate, styrene, methacrylic esters, acrylic esters, ethyl acrylate, butyl maleate, ethylene Other speciality modifying monomers.

ean oil fatty acids. Other possible
odifications, include treatment with
ocyanates to give 'urethane alkyds'
nd reaction with a polyamide to
eld a product with a marked degree
thixotrophy, enabling quite thick
oats to be applied without the risk
sagging.

It is in the area of industrial fin-
hes that alkyds reveal their diver-
ty. They feature as main or major
omponents in coatings used for
gh-quality stoving enamels for
otor vehicles and for domestic and
ffice appliances; insulating var-
shes; nitrocelulose lacquers for
rniture; acid-curing enamels;
pid-drying one-coat primers and
nishes; paints for machinery and
gricultural equipment; roller-coating
namels; varnishes for metal deco-
ating; and many others.

The oil content of 'short oil' alkyds
sed for industrial purposes is nor-
ally less than 45% and, in contrast
decorative alkyds, stronger sol-
ents such as xylene are required to
chieve solubility. The modifying oil-
can be drying or non-drying; the
tter are used for resins intended as
asticisers for lacquers. Very few
dustrial finishes contain alkyd
sins alone as the binder; a variety
other types are used in combina-
on, notably amino, melamine and
trocellulose resins.

An example of how the chemical
dustry at large has assisted the
int resin manufacturer by provid-
g new starting materials was the
evelopment some years ago of
*ardura** resins. These are non-
ying alkyds derived from a
anched-chain synthetic acid *(Ver-
tic* 10). Cardura E10* in particular
ds extensive use as an intermed-
e in the manufacture not only of
kyds used in a variety of stoving
ishes, but also of acrylics, polyest-
s and other polymeric resins for
dustrial finishes. The many combinations possible offer the paint formulator considerable scope in meeting customer needs.

EPOXY RESINS

Epoxy resins, almost as ubiquitous as alkyds, contain an epoxide or oxirane grouping along their polymeric chain structure, together with hydroxyl groups. They are manufactured from epichlorhydrin and a dihydroxy compound, usually bisphenol A. (Products commercially available include *Epikote** resins and *Epikure** curing agents).

A major application is in the preparation of epoxy resin esters by reaction with vegetable oil fatty acids. These resemble alkyds in many ways but show distinct advantages in respect of adhesion, flexibility, and resistance to water and chemicals. Coatings based on such esters can be cured by cross-linking by air-drying or stoving, either alone or with a resin such as melamine formaldehyde. Typical applications include heavy-duty coatings for chemical plant; storage tanks; industrial primers and finishes for metal and wood; automotive primers and primer-surfacers; and drum coatings.

Solutions of solid epoxy resins of high molecular weight are used in combination with phenol and urea formaldehyde resins to produce high-performance linings for metal cans for food and beverages.

The terminal groups of epoxy resin chains react readily with amines. This property is used to advantage in the manufacture of two-pack systems (in which resin and curing agent are supplied separately) which posses a combination of adhesion, flexibility, toughness and chemical resistance. They are widely used for the protection and maintenance of metal structures such as storage tanks, pipelines and off-shore rigs. They are also employed in the formulation of 'high-build' mastic coatings which can be applied as one coat 150-200 microns thick.

The above are examples of solvent-based coatings. Epoxy resins are also used to formulate 'high-solids' (up to 90% by weight) and solvent-free paints. Another course is to use the resins to make water thinned two-pack coatings. These are favoured where a high solvent content is undesirable because of the risk of fire or atmospheric pollution, or where painting has to be carried out in confined areas such as ships' holds.

A further important outlet for epoxy resins is in the form of dry, free-flowing powders which are fused by heat to form a continuous coating with good mechanical properties and high chemical resistance. Such products are usually applied by electrostatic spraying or by the fluidised-bed technique. They have advantages over conventional liquid paints in being economic (no expenditure on solvents that are not part of the final film; generally one-coat application; and highly efficient usage of material by simple recovery) and also acceptable on health and safety grounds.

Powders are formulated by crushing the resin, thoroughly blending it with the other components (curing agent, pigment and additives), and passing the mixture through a heated extruder. The consequent blend is cooled, ground, sieved and packed for use. Powder coatings are typiclly used for the protection and decoration of office and school furniture; domestic appliances such as refrigerators and washing machines; bicycle frames; automobile wheels and components; electrical equipment; and both the interior and exterior surfaces of pipes.

VINYL AND ACRYLIC DISPERSIONS

Emulsion paints have been very much in vogue for the decoration of walls and ceilings for many years. These paints have, by definition, the virtue that they can be thinned by water, making the cleaning of brushes easy, and they are, moreover, free of conventional solvents. They are based on a variety of vinyl and acrylic monomers, chosen to provide the necessary properties of flexibility, hardness and so on. They are made by emulsion polymerisation and stabilised by various protective colloids and surfactants. Normally, they also contain preservatives to ensure that no breakdown occurs in the can or in subsequent use.

More recently, ethylene has been used as one of the monomers in vinyl emulsions. In this case, polymerisation is carried out under pressure -- hence the term 'pressure polymers'. These emulsions are frequently based on vinyl acetate, vinyl chloride (to provide hardness) and ethylene.

Typical monomers used in the manufacture of emulsion paints are vinyl acetate, 2-ethyl hexyl acetate, butyl and methylmethacrylate and acrylic acid.

The choice includes a number of novel petrochemical compounds, such as *Veo Va* 10*, the vinyl ester of a synthetic saturated monocarboxylic acid mixture of highly branched C_{10} isomers which confers excellent exterior durabilty and high resistance to alkalis to emulsions --and hence paints -- in which it is incorporated as part of the monomer mixture.

Veo Va 9, a recent introduction, is a much harder monomer than *Veo Va 10* and can therefore be used as a partial replacement for vinyl acetate. The resulting terpolymers can be used to produce emulsion paints with better resistance to alkalis and wet srubbing.

The paint industry is extremely complex in respect of the products that it manufacturers, the sophisticated nature of the raw materials that it uses and -- as will be seen in subsequent articles -- the wide areas of end-use thatit serves. It is also highly technically oriented, especially in industrial paints -- and relies heavily on the petrochemical industry for its supplies.

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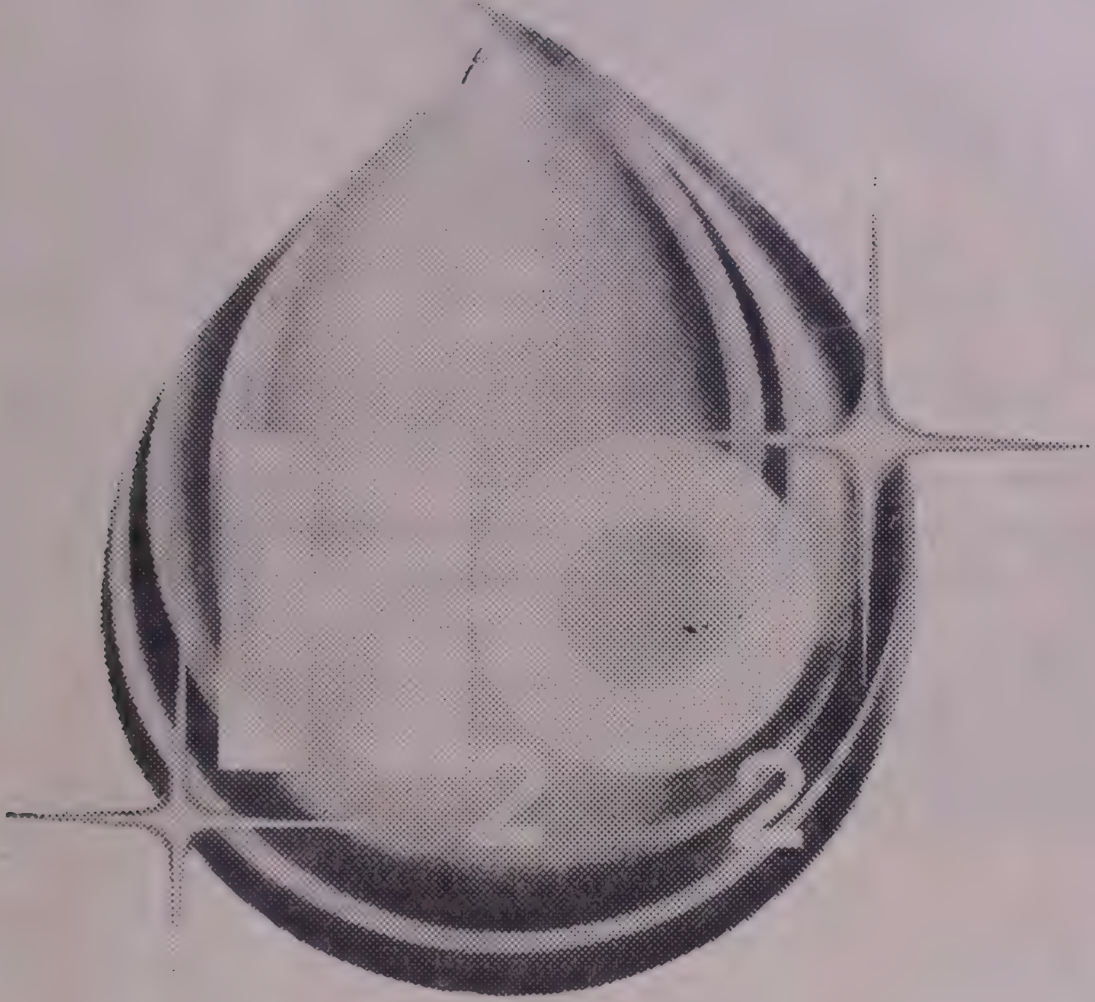

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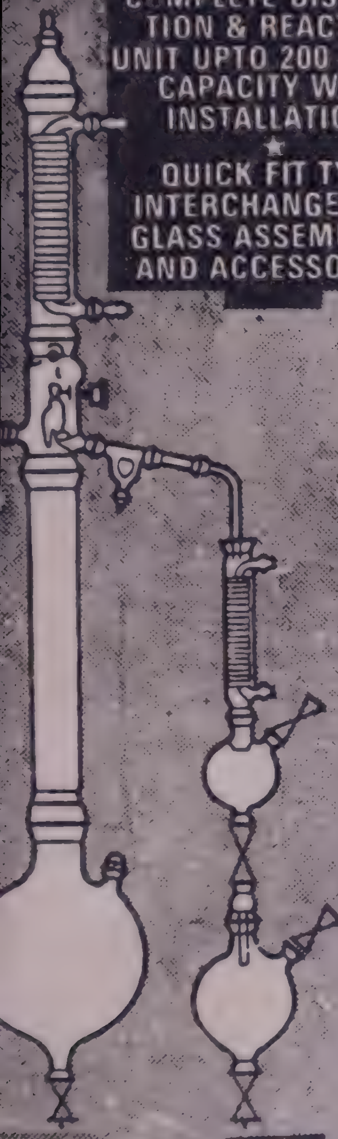

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Chemical Markets Abroad

PROPYLENE SELLERS TO PUSH FOR MONTHLY CONTRACTS

Propylene sellers in Western Europe are planning to push at this year's European Petrochemical Association (EPCA) meeting in Vienna for monthly, instead of quarterly, supply and price contracts with customers.

Shell, Europe's biggest propylene trader says it intends to steer trading of ethylene and propylene towards a monthly basis and, for ethylene, to win agreement on prices before delivery is made. Dow is understood to be supporting the initiative and other producers, such as ICI, will follow the trend.

Shell's reasoning lies in the fact that feedstock values for Europe's ethylene crackers can change from day to day, thus producers often have to cope with wildly fluctuating raw material costs in any quarter. Propylene selling prices fixed for three months at the beginning of the quarter can often end up looking very out of line with either costs or spot values.

This distortion often carries over into distracting attempts to get compensation next quarter Shell's idea is to bring some order to what it sees as the present propylene market disarray, even if this means negotiating deals 12 times a year.

As far as ethylene is concerned "The industry has fallen into the bad habit of establishing prices after the event . . . which is unusual in most areas of commerce," a Shell spokesman said. Even within the derivatives areas of the chemical industry, notably plastics, monthly pricing is practised, Sheil observes.

Within the confines of certain contractual obligations, Shell will start negotiating contracts on the new basis in the fourth quarter. It has already been signalling its intentions to customers and claims that so far for ethylene the idea has been received positively.

At the moment, Shell points out, customers are caught between high contract and low spot prices for propylene. Contracts were fixed at just over DM700/ton for the third quarter, but spot prices have dwindled to below DM500/ton. The company does recognise, however, that propylene is structurally short in supply and firming of prices in the longer term is inventable.

Customers in Europe were firmly opposed to notions of monthly contract negotiations. The more cynical said such steps were not unexpected when spot prices are low and producers see a tightening of supply. Propylene is currently considered to be at the bottom of its price cycle.

"One would spend all the time negotiating," a major customer commented. The buyer did concede, however, that it would have the advantage of "avoiding the games that are played" every quarter. For example, sellers may claim shortages but then stock up with product to push on to the market after satisfactorily high prices have settled. Buyers, on the other hand, might run up stocks or claim plentiful international sources of supply, in order to talk prices down.

Two of West Germany's biggest purchasers, BASF and Hoechst, are against the idea of negotiating monthly prices. "As far as a business group is concerned it makes the whole pricing structure difficult to manage. If you have definite prices you can plan the business strategy in a more long-term way", one West German buyer observed. "Its really a case of our marketing people reflecting their raw material needs to the purchasing department."

Their US colleagues are already operating satisfactory monthly pricing systems. But, Europeans point out, the US market is more homogenous and a much better example of the freely competitive market-place in that there are numerous suppliers and customers negotiating deals in each product area.

Europe does not lend itself to perfect competition as for some products the business tends to be led by certain major suppliers and buyers.

It is for this reason that attempts so far by producers to establish forward contracts for ethylene, rather than the restrospective pricing that has become common in Europe, have stumbled.

BP Chemicals took an initiative during the summer on this issue, saying that retrospective pricing, which dates back to 1981/82 when ethylene was in oversupply, was anachronistic in today's balanced market. The view of one of the major buyers, however is that price negotiations are protracted enough when all relevent information about spot prices, feedstock movements and exchange rates is known. Thus to try to negotiate in the dark for the forthcoming quarter would be impossible.

BP now says it is still looking at the possibility of monthly pricing for ethylene and propylene, but is under the impression that most customers prefer to stick to quarterly prices.

The issue of seeking forward contracts for ethylene arises from a perceived departure by some customers from what producers believe to be the traditional rules of the game. Both parties came to the negotiating table at the end of the quarter with full information on, for example, derivative price settlements and full costs, and expect to firm up the notional ethylene price into an agreed retrospective contract for the quarter. Some buyers stand accused of "coming to the table with a hidden agenda," however, wanting to delay settlement into the following quarter.

As far as propylene is concerned many producers believe that because a monthly price agreement would span just four weeks instead of 12, exposure to market fluctuations would be lessened and deals would inevitably be settled quicker.

Maybe, one major firm observes, such a policy would have the additional benefit of enabling producers to better control their business. The influence of traders would be reduced, as would the significance of the capricious spot market.

Propylene and benzene, it is considered, are the two products most suited to a monthly-type contract. One major benzene buyer has already indicated willingness to operate on such a basis.

Earlier this year, Total in France pioneered attempts to move ortho-xylene on to a monthly contract basis to escape the influence of the major West German buyer BASF, which effectively sets the market price with its deals.

Pierre Marcillac, Total's head of orthoxylene and paraxylene, admits to no success as yet, although he still believes that the orthoxylene contract price was too low in the first quarter.

"To be practical, we expect that after we start up our new isomerization unit in the second quarter of 1988 we will have far more flexibility on orthoxylene production and will have far more flexibility on policy and volumes. We will produce or not produce orthoxylene according to the price we can get," Marcillac says. He admits that Total will "use the market." Long-term contracts will be adapted and long-term customers have already been given some idea of changes to come.

The ability to supply or not will be the crucial factor in producer's success in winning customers over to monthly propylene contracts. Shell points out that for polymer producers raw material costs represent 60 per cent of total costs and are therefore a "life and death factor" for polymer makers.

The greatest task clearly will be to swing the big West German buyers — which still believe strongly in the stability of quarterly contract pricing-over to monthly negotiations. For propylene, it is felt, the idea might work because in general West Germany is a relatively vulnerable net importer of the product from crackers in adjacent Benelux.

ICI in the UK has already fixed some monthly contracts for methanol with West German customers and says it is willing to do this on a permanent basis but would not want customers to subsequently switch back to quarterly prices.

The UK firm has also agreed with a coproducer in one instance to use a monthly ethylene pricing mechanism for an extended trial period, with no retrospective price alterations.

EPL SERVICE LAUNCHED

Europe's petrochemicals market now has its own arbitration service. Belgium-based European petrochemicals luncheon international association (EPL) has started a conciliation service to mediate in trading disputes between its members. One of its first cases could be an already sub judice clash between two Dutch traders.

The mediation package — EPL conciliation and advisory service (Ecas) — aims to provide a first-instance arbitration service giving "independent and unbiased" support to side-step expensive and protracted judicial proceedings. EPL committee members say they expect Ecas to deal with two or three cases a quarter.

Its first case may involve Oxyde Chemicals of Amsterdam and Loga Chemicals of Zeist in the Netherlands, which are currently locked into litigation over a benzene shipment. The case is an obvious example for the new Ecas panel to cut its teeth on, admits an EPL committee member.

Apparently, a recently-departed member of Oxyde's trading staff contracted with Loga to purchase a benzene parcel, but omitted to mention the deal to Oxyde management. By the delivery date benzene prices had taken a dive, and Oxyde, claiming no knowledge of the arrangement, refused to take delivery. Loga is now suing Oxyde and possibly the Oxyde staff member personally.

Ecas's stated objectives are to assist disputing producers, consumers or traders to agree out-of-court settlement without prejudicing their judicial rights, and informally to advise parties ahead of potential disputes. Speed, confidentiality and low cost, are the keynotes, says the EPL Committee.

The 18-member Ecas panel, comprises representatives from EPL member companies as well as an arbitrator from the French international chamber of commerce. Disputing parties can each select one panel member, and a third will be appointed to mediate. All three will charge a BF20,000/day fee.

Ecas will initially be confined to payment, delivery and quality, issues between EPL members, but could grow to include other parties and types of disputes providing the panel recruits the necessary experts. Disputes between contractors and hardware purchasers are one example.

A suggested wording has been sent to EPL members for an "Ecas service available" clause in their business contracts. EPL committee members say they will themselves be including the clause in their own contracts.

Ecas was born partly out of one bitterly acrimonious trader/producer dispute around three years ago.

MITSUI SIGNS NEW SOVIET COMPENSATION TRADE DEAL

Mitsui & Co. of Japan and Soyuzichim-export, have just signed a contract worth $135m. This represents the compensaion part of the ammonia modernization contract signed by Toyo Engineering recently.

Under the Mitsui deal, which ncludes $100m in plant-supplies and $35m interest, the Japanse trader will lift ammonia, rea and methanol from the USSR. The deal will run for ight years from the acceptance of plants by the ministry of fertilizers in 1990.

Under an old contract Mitsui is still obliged to lift ammonia for the next three years and hopes to achieve this at rates of 130,000 ton/year, to complete the deal by the time the new one comes into force. One of the problems, however, is that increased domestic demand for ammonia in the Soviet Union has left Soyuzichimexport with lower tonnage and the Soviet firm cannot supply the agreed quantities.

Mitsui has given its Soviet partner some indications of the quantities it could lift under the new deal. These are 100,000 ton/year of ammonia, 50,000 ton/year of urea and 100,000 ton/year of methanol. However, this depends on future market conditions and the precise numbers will be worked out in two years' time.

If the deal comes off it will be the first time that Mitsui has traded in Soviet methanol. Its usual markets are Europe, Japan and South East Asia.

Soviet port facilities handling cargo to the Far East are not equipped to handle liquid chemicals and there are plans in hand to construct new facilities. At present Mitsui is lifting ammonia from the Yuzhnyi port on the Black Sea. The company is not allowed to import into Japan.

EEC LIFTS DUTY ON US STYRENE

The European commission has finally decided to lift the anti-dumping duty on imports of styrene from the US. An inquiry led by the commission has shown there is currently "no prejudice" for community producers. The decision is unlikely to have much effect on the tight styrene market as US prices are now close to European levels.

Dumping duty was originally levied in February 1981 on US producers deemed to be selling material into Europe above a 26 per cent dumping margin. The law was due to expire last year, but Cefic, the European confederation of chemical manufacturers' federations, asked for another inquiry, alleging that the styrene market was still suffering injury from US imports.

However, the investigation showed that although dumping was being practised by some US exporters, margins varied between only 1.9 and 5.9 per cent. It concluded that imports from the US had not increased or caused any erosion of prices in Europe.

Since 1982 US styrene imports have decreased from 40,000 ton to 17,500 ton for the first six months of 1986, representing a drop in market share from 6.4 to 3.3 per cent. Over the period of investigation, it found that the market share of dumped products was less than that dumped product undercut European styrene or caused any price depression.

Although styrene prices did fall during the first half of the investigation, this was due to falling raw material cost rather than imports. The situation has since become more favourable for European producers with prices firm and improving margins.

The outlook for styrene remains good in Europe for the current year in view of sustained demand and capacity limitations, Brussels believes. As in 1986, supply shortages will persist in keeping styrene prices at high levels and should maintain good profitability for producers in Europe.

ORGANIC PEROXIDE USE TO GROW

Consumption of organic peroxides in the US as polymerization initiators and cross-linking agents reached 19,000 ton in 1986, representing some 85-90 per cent of total production, according to a report by consultant Chem Systems.

However, the importance of these materials to the polymer industry extends well beyond this relatively small volume, the report notes, as demonstrated by their use in the production of more than 8m ton/year of polymers in the US.

For conventional uses, demand for peroxides in the US is expected to reach around 23,000 ton by 1990 and 26,000 ton by 1995, representing an average annual growth rate of 3.4 per cent. However, demand growth in Western Europe and Japan over the same period is expected to be rather lower, averaging around 2.5 per cent in each region.

FLUIDIKS TO START TRADING AGAIN

Amsterdam-Based Fluidiks is poised to return to normal trading activity after an extended period of low-profile hampered by debt.

Following a vote in court by 99 per cent of its creditors to accept an intricate debt repayment plan, Fluidiks was obliged to wait for an eight-day appeal period, until September 16, before resuming normal trading.

The company's total debt, for payment purposes. amounts to Dfl. 40m ($19m) — payable to creditors on a staggered basis in a range from 19 to 100 per cent according to exposure.

Fluidiks' managing director, Dr. J. J. Blankert said he hoped that with a lot of effort the company would reach the volumes of business carried out before it ran into debt. For a period of around a year Fluidiks has not been allowed to take title to goods but has continued to trade on a commission basis. This has reduced volumes handled by around 40 to 50 per cent.

The trader has significant contracts and arrangements with sister company Gadot in Israel and with USI of the US and some others. It plans to continue trading in all basic chemical areas, maintaining a team of 13 traders in western Europe plus its business in the East Mediterranean.

"We are going to proceed very carefully but be very very active in all markets", Blankert said. He stressed that the former ties between Fluidiks and its shipping operation, Eurochem, have been completely severed.

It was problems concerning high-cost guarantees of charter payments that led Fluidiks into debt in the first place.

ETHYLENE TERMINAL

South Korea's Han Yan Chemical Corp has placed a contract with Nippon Kokan KK in Japan to build a liquefied ethylene receiving terminal in Yeo City. Construction of the 5,000 ton storage tank will be completed by December and will include a reliquefaction plant, compressors, feed pumps, flare stackers and electrical instruments. Han Yan Chemical Corp is a member of the Korea Explosive Comp

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News from the American market

YETHYLENE PRICE MOVES TINUE

alyethylene price increases gaining support, following an ase of 5 cent/lb by Nova- Chemicals. USI Chemicals d its prices by 5 cent/lb for -density polyethylene (HD- and 4 cent/ib for low-den- and linear low-density ma- l. Dow Chemical raised Oct. rices for the three resins by ent/lb. The Society of the stics Industy says that U.S. s and captive use of low- sity polyethylene rose 4%, to 4.8 billion lb, in first- 1987, while HDPE climbed 3%, to 3.9 billion lb. Pro- tion rose 6.3%, to 4.7 bil- lb, for low-density material, 8.6%, to 3.8 billion, for PE.

IETHANOL SURGE IS STLY ON PAPER

n apparent 15% gain in U.S. hanol output in first-half 7 is only apparent because 6 production was underrepor- to the International Trade mission (ITC). When 1986 es are revised, the 1987 gin over 1986 is likely to be l. Producers, nevertheless, the market is getting snug- The reason, apparently, is asing demand for methanol nake methyl tertiary butyl (MTBE), an octane impro- Output of MTBE, accord- to Information Resources shington, D.C.), is running e rate of 60,000 bbl/day. ut of formaldehyde, traditio- the largest outlet for metha- s sluggish. According to formaldehyde production 2.95 bn. lb in first-half '87, about 3% from the level in the year-earlier period. Nominal capacity for methanol is 1.9 bn. gal/year, but shutdowns and mothballing have apparently cut the effective capacity to a much lower figure, and it may be tested if producers continue to run at a rate of slightly more than 1 billion gal/year.

PRICES RISE FOR ORGANIC PHOSPHATE ESTERS

FMC Corp. has raised prices of Kronitex and Durad triaryl phosphate esters by 5-10 cent/lb, effective Sept. 1, or as contract terms permit. The increases cover more than 15 different products in the Kronitex line of flame-retardant plasticizers and Durad fire-resistant hydraulic fluid base stocks. Current prices, f.o.b. FMC's Nitro, W. Va., plant, range from $1.11/lb to $1.19/lb for Kronitex products and from $9.40/gal to $15/gal for Durad products. The company says that the move is "the first general increase in FMC's phosphate ester pricing since 1981."

VINYL DERIVATIVES BECOME DEARER

Two producers have raised prices of vinyl derivatives. Air Products and Chemicals upped Oct. 1 prices of some products to the paper and carpet-backing markets, in a move to recover increases in the cost of vinyl acetate monomer and other precursors. Paper market prices for polyvinyl acetate, vinyl acetate-ethylene and ethylene vinyl chloride emulsions rose by 3 cent/dry lb; for vinyl acrylic emulsions, by 4 cent/dry lb. Prices in the carpet-backing market will rise by 4 cent/dry lb. The increases amount to 3-5% in the paper market, 7% in carpet backing. Union Carbide raised prices of vinyl acetate homopolymers by 1.5 cent/wet lb and copolymers by 2 cent/wet lb, effective Sept. 15.

CHLORINE OUTPUT STAYS ON AN EVEN KEEL

Chlorine output in June was up slightly from the level in May, but a little below that of June 1986, the Chlorine Institute says. Cumulative output in 1987 also is maintaining a slight edge over that of 1986, with production for first six months of 1987 at 5.36 million tons, compared with 5.29 million tons in the 1986 period. The institute estimates, however, that plant shutdowns have sliced capacity so much that the industry's operating rate in June was 96.8% of effective capacity, compared with 84.2% a year earlier. Producers say it is uneconomic to reopen much of the capacity at current price levels, and they continue to seek the elimination of price discounting.

ACETONE PRICES SLIDE DOWNWARD IN EUROPE

European acetone prices are the victim of strong demand for phenol. The building and auto industries are thriving in Europe, putting an upward push into the phenol market. Producers, in an effort to keep up with that demand, continue to pump out coproduct acetone whose markets are sluggish by comparison. With inventory levels thus likely to remain high for some time, little hope is held for acetone to move above the key mark of $382/metric ton ($1=1.83 German marks). Producers see little chance of stabilization until prices fall about 10% below that level

In the European Market

The naphtha market has been very subdued, with prices little changed this week at $ 155-158/ton cif Rotterdam.

Poor demand from derivatives producers and surplus supply have depressed propylene prices further to DM460-470/ton cif NWE, although higher prices are still being heard. Ethylene prices are firm and steady at $490-505/ton cif NWE, although lower, but unconfirmed, prices were heard this week. Various European plant shutdowns are keeping supply tight, setting the scene for a contract price hike.

Butadiene prices have firmed up by another five dollars to $545-555/ton fob, underpinned by a severe shortage in the US where prices are around 30 cents/pound. Fourth quarter contracts are still forecast to firm to around FF$3,800/ton from current FF3,150/ton.

Benzene prices have slipped five dollars to $260-270/ton. But trading has been quiet. Dow Chemical and Deutsche Shell have closed their HDA units, but this has had no apparent effect on prices. US storage is full with spot prices at 93 cents/gallon Contracts could fall to DM500/ton.

Toluene prices have slipped by ten dollars to $195-205/ton under pressure from a lack of gasoline demand and slack HDA interest. US trading is thin at around 68 cents/gallon. Some preliminary fourth quarter contract talks at around $200/ton have been heard. This would represent a drop of $255/ton on current contracts.

Solvent **xylenes** prices are weak.. Demand for virgin at $240-245/ton remains slack.

Orthoxylene prices are weak at $275-285/ton, and lower prices have been reported although there is some interest from India. European producers say orthoxylene is still underpriced relative to para and xylenes.

Paraxylene prices have dropped again to $310-320/ton in a bearish market. The India tender for 4,000 ton closed with the lowest offer in at $345/ton ci Bombay. US prices are aroun 16 cents/pound fob US Gulf.

Styrene prices are holding up better than expected, although the price range has been widened to $1,200-1,250/ton fob T2. T1 prices are quoted at $1,120-1,130/ton cif NWE, and $1,100-1,150/ton fob US Gulf. US inland spot material is quoted at around 51-52 cents/pound, with 53 cents heard. US supply is tight. Material has left Taiwan US-bound at $1,000/ton fob.

Methanol production problems in the Netherlands have firmed prices to DM230-235/ton fob Rotterdam, $125-130/ton. T1 prices are steady at $107-110/ton cif NWE. A compressor fault in Methanor plant, North Netherlands is likely to put it out of action for up to three weeks and availability has already tightened by shortfalls from the 750,ton year Soviet Tomsk plant. Libyan production is low and no Saudi shipments are expected before early-October. While methanol prices are high there is poor demand from the gasoline poool.

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News from Japan

eda Chemical Strengthens rseas Marketing Of erinary Drugs

'akeda Chemical Industries is
ngthening its overseas opera-
s in the veterinary drug bu-
ss. Its partner companies in
contract areas have been ex-
ding the sales of its main-
drugs such as "Conceral"
the treatment of reproductive
orders in cattle.

'akeda Chemical Industries
plans to bring the sales of
erinary drugs to a level of
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world its patent on "Hygro-
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" an antibiotic for dysentery
igs available on the market
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he veterinary drug division
'akeda Chemical Industries
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y drugs now account for ar-
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et will continue to be satu-
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e reason why the company
come to place clear empha-
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ffiliation with overseas com-
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ago has begun to bear
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ain line products "Conce-
has begun to be sold in Eu-
and the United States
gh Upjohn, and "Enramy-
a growth promoting agent,
hown encouraging sales ex-
on in Southeast Asia. Moreover, a sales campaign will start from this August in Indonesia, and the company is earnestly seeking an affiliation with companies in the United States, Europe, and Southeast Asia, one in each of these areas. Thus, the company's tactics for overseas operations has been becoming clear.

If these plans will be going well, domestic supply networks and greater cost reduction in supply will be achieved. Thus, these supporting effects will strengthen the foundation of its veterinary drug division as a whole.

The company has already disclosed its patent on "Hygromycin A," which has the same performance as that of "Takelan." This will therefore become available for use and, according to the company, negotiations are due to commence if offers for the product are received.

Takeda Chemical Industries realizes that veterinary drug business required considerable time and effort and has been paying particular attention to safety in domestic operations. The company says that it will place equal emphasis on overseas operations.

DIC-Hercules To Build Paper Chemicals Plant In Kurashiki

DIC-Hercules Chemicals, Inc. is planning to build a manufacturing plant for paper/pulp chemicals (wet-strength resin, neutral sizing agents and antifoaming agents) in Kurashiki, Okayama Prefecture at a total cost of Y3,000 million. The new plant will turn out 5,000 million yen's worth of the products annually.

First-phase plant construction will be inaugurated at the end of this year with start-up scheduled for the end of 1988. Second-phase construction will start at the end of 1991.

The planned plant will act as a production base for western Japan. The company has already built the Chiba factory in the eastern part of the country.

The company specializes in production of paper/pulp chemicals: it was established by Dainippon Ink and Chemicals' and Hercules (US) on a 50-50 ownership basis. Its main production items are sizing agents for neutral/alkaline paper manufacture, resin-emulsion sizing agents for acid paper manufacture, wet-strength resins, and antifoaming agents for a craft paper-washing process.

The company recently began marketing a printability aid, showing a positive approach toward product development. It is consolidating relationships with Hercules' R & D bases in the U.S. and Europe.

Tightness of PVC to Increase Further

Domestic demand for vinyl Chloride (PVC) resin has continued to be brisk and the supply-demand situation has become tight.

Imported products are decreasing, reflecting the worldwide tight supply situation.

Exports from Japan are unable to satisfy supply of products on a large-spot-contract basis.

Domestic deliveries of PVC in January this year registered 117,000 tons (4.8 per cent rise against the same month of previous year) and since February they have maintained the 120,000-ton level, reflecting favorable demand for regid PVC for pipes, sheet for industrial use, sundries and rain-water pipes, and general-grade flexible film for construction materials and industrial use as well as for electric-wires use.

From now on the effect of the government's domestic-demand expansion policy will be mainfested in increased production of rigid PVC for pipes and electric wires. Consequently, the tight supply will be accelerated further.

Price Hike For Sorbic-Acid Products Slated For Oct. 1

The Nippon Synthetic Chemical Industry Co. is planning to raise CIF prices for sorbic acid and potassium sorbate by at least 20 percent, starting with October 1 shipments to such dollar areas as South America, Oceania and Southeast Asia. The two products are used as synthetic preservatives such as antiseptics and antimolds. The company thereby intends to make-up for foreign-exchange losses stemming from the high appreciation of the yen and poor production economics caused by increased raw-material costs. Other domestic makers will follow suit since they are also in similar circumstances.

The products are extensively used throughout the world, in particular dollar areas. They have recently come to be rated for their high safety equivalent to that of food additives. They are used in, for example, California wine and pet food. In the U.S. Demand for the products is increasing in newly industrializing countries (NICs) in Asia, reflecting market improvement of eating habits there.

They are continuing to show a show a high annual growth rate of 5-7 percent in the Asian NICs.

All domestic makers including Nippon Synthetic Chemical Industry are, however, suffering from huge deficits due to the abovementioned poor production economics and foreign-exchange losses.

Toa Paint To Start Building New Factory

Toa Paint Co. has started constructing a chemical factory at Kurashiki City, Okayama Prefecture to manufacture acrylic emulsion, vinyl acetate emulsion, fiber-processing materials and acrylic rubber for automobile use.

The company will start 1st-phase construction work and will put the factory into operation in the autumn of next year.

It will purchase a 13,300-m^2 factory site in Kurashiki City. The 1st-phase factory will be a 4-storied ferroconcrete building with a total floor space of 2,250 m^2. The factory will manufacture acrylic emusion, vinyl acetate emulsion, acrylic rubber for woven fabrics-coating us (brand name: Toa Acron S and acrylic rubber for autom bile-parts use (brand name: T Acron AR).

The production capacity w be 800 — 1,000 tons month and the employees will numb 20. Constructon of the new fa tory will be completed (1s phase plan) at a cost of abo Y84,000 million.

Chichibu Cement Active In High-purity Mullite Business

Chichibu Cement Co. has d cided to construct a mediu scale plant for high-purity m lite fine powder within this ye to meet users active requir ments.

The company will map out formal plan and execute it sho ly.

According to its informal pla the plant's production capacity to be 500 kg — 1 ton. The co pany is to set up the plant at i development department (K magaya City, Saitama Prefectur and hopes to put it into oper tion within this year.

As a result, it will be able deliver samples to various user

Furthermore, its ceramics te hnology center — its R & D ba — will place emphasis on R& on mullite as well as composi ceramics using mullite as a bas

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CHEMICAL WEEKLY
SUPPLEMENT ON

LEATHER PROCESSING

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SPOTLIGHT : LEATHER INDUSTRY

Though the value of exports of leather garments and goods exceeded Rs. 150 crores in 1986-87, India's share in the developed markets barring centrally planned economies, remained at a dismal 1.39 per cent. The share of the country in the total import of the U.S. was a mere 0.39 per cent. Recent studies by C.L.R.I. Scientists have indicated that substantial progress in the export front could be achieved with the introduction of better processing machinery, modern management methods and improved material control.

***CHEMICAL WEEKLY** makes an auspicious start this week in a special **Diwali Supplement** to highlight the developments and progress in the field of leather processing and chemicals. The feature, to appear monthly will aim to cover, in a nutshell trends in styles of leather goods both in India and abroad, new methods of processing, methods of evaluation of leather chemicals etc. Comments and criticism from our readers are most welcome.*

*-- **EDITOR.***

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BEAMHOUSE AND TANYARD PROCESSING

A SYSTEMATIC ACCOUNT OF THE PRECONDITIONS FOR CONSISTENT QUALITY

Dr. J.C. CROWTHER

(Reproduced from *Sandoz Colour Chronicle* **July/Sep. 1987)**

ummary

The consequences of soaking, ming, bating, pickling, tanning and etanning are discussed. The need or good fibre sepration, removal of on-leather-making matter, espeially fat and fatty acids, is stressed. he characteristics of surfactants nd their role in preparing the pelt for niform tanning is described. Nine ifferent retannages, their method of pplication, effect on the leather and mpact upon the subsequent dyeing rocess are detailed. The need to void a build-up of neutral salts is tressed. Throughout the paper, the eed for uniform distribution of taning and retanning materials is elated to the objective of consistent uality in the ready-to-finish crust.

reparation of raw pelt for tanning

The function of soaking, liming, ating and pickling in preparing the aw hide for tanning is well known. he major physico-chemical objecves and Control points are as folows:

oaking

Rehydrate entire tissue, collagen, soluble matter between the fibers
Remove adhering dung and blood
Remove excess salt
Disperse grease
Prevent putrefaction
Commence fiber separation.

ontrol Points for consistent uality

- **Condition of the raw material (how dry and dirty?)**
- **Temperature and time**
- **Addition of wetting, scouring and emulsifying agents**
- **Addition of bactericides**
- **Drum speeds**
- **Drum dimensions.**

Comments

The great influence on this part of leather processing has been environmental protection. Water consumption tends to be reduced, with the result that fewer changes of soak lead to build-up of protein decomposition products and bacteria. The importance of antiseptics and wetting agents to speed up the soak has been increased as a result.

Protection of ground-water resources in areas of low rainfall has led to a concern about pollution by neutral salts. In certain areas the specifications for effluent quality include the maximum electrical conductivity allowed. The chief contributing pollutant is common salt brought into the effluent from raw hides. As a result green hides direct from the slaughter house are being processed.

Tanneries forced to process unsalted raw hides have found that the leather quality deteriorated becoming boardier and harder. Common salt, previously accepted as just a convenient, cheap preservation is more than ever appreciated for its beneficial effect on the pelt fiber; starting the fiber separation. KEMP and STAINSBY of the University of Leeds have summarized the effects of salt:

1. removes the water from the tissue by competition
2. assists in removing mucoid material by decreasing its entanglement in the tissue.

Mucoids are sugar polymers with sulfate and carboxylic anionic side groups.

Significance of mucoids in raw hide

To quote the authors: "Mucoids are thought to form an extensive, highly hydrated gel network between and around the collagen fibers. This network immobilizes water and forms a non-compressible system, complementing the high tensile strength of collagen . . . studies have led to a model for connective tissue as consisting of a relatively coarse fibrous network of collagen fibres, filled with a much finer network of polysaccharides 'trapped' within it.

"The presence of mucoid material has a selective filtration effect on the passage of solute molecules according to their size, shape and charge. Their presence will greatly affect the transport of the various solute molecules through the fiber structure. The major problem concerning mucoid material will be the variability of its loss during the various pretanning processes. Factors such as pH, temperature and time will affect the extent of mucoid extraction, and variations in extraction are likely to be appreciable. Variation in mucoid content interferes with the production of a uniform product."

Removal is enhanced by increased temperature, decreased pH (anionic side groups are undissociated) bacterial action and surfactants.

Although bacterial enzymes have been proposed as a soaking aid to assist in this situation, BETTY HAINES of the British Leather Manufacturers' Association has stated:

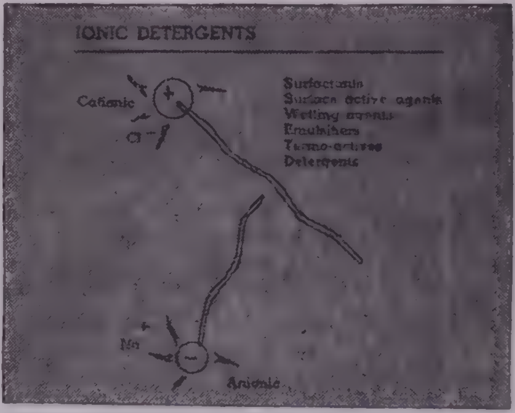
"In our experience, the use of excessive amounts of soaking enzymes, which are derived from bacteria, can also render the hide vulnerable to heat and alkali. It is our opinion that tannery processes should not be operated at 'knife-edge' conditions. For example, the temperatures used in processing should not be so high that relatively small changes in the conditions of the raw hides (exposure to bacterial enzymes) result in damage. We would suggest restricting the liming temperature to below 86°F (e.g. 77-82°F) and to partially delime the pelt so as to reduce the surface pH before the pack is washed warm prior to bating. In this way the incidence of sueded grain could be minimised".

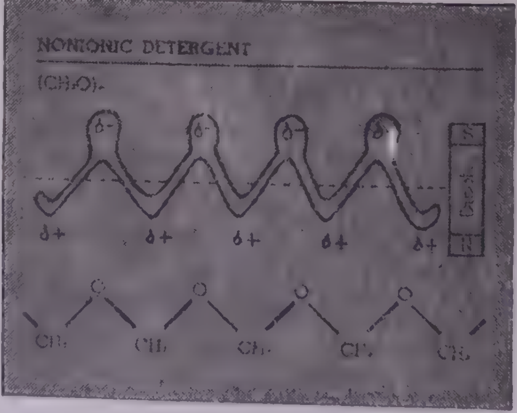
In my personal experience of markets where 'cold' water has a temperature over 90°F, the practicality of keeping temperatures at 77-82°F is limited. The best way we have found to protect the sensitive grain enamel is the appropriate use of surfactants in the correct pH range, rather than the use of soaking enzymes.

Correctly chosen surfactants disperse the non-leather-making matter, the fats and mucoids degraded during liming, and improve the slippery surface in the drum. The reduced friction helps to prevent mechanical abrasion -- this can be so slight that it only shows up as spots of increased finish absorbency, visible as matt areas on the finished leather. Such damage has been illustrated in excellent scanning electron micrographs (B. HAINES, B.L.M.R.A.) clearly showing how the grain enamel is destroyed.

The correct choice of soaking auxiliary

Surfactants are characterized by having two distinct parts to their molecular structure:





- an ionizable polar group which is hydrophilic
- an organic oily chain which is lipophilic.

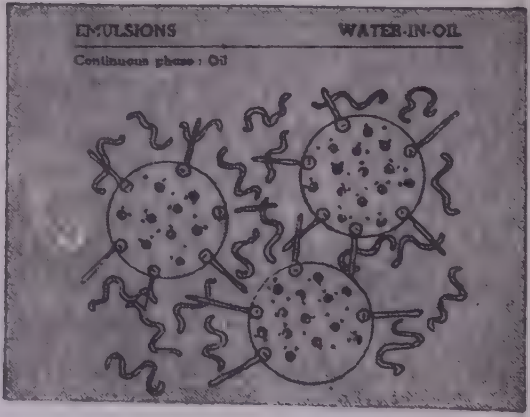
Nonionic surfactants obtain their hydrophilic property from the ethylene oxide monomer residue, which although not ionizable, has a certain polarity.

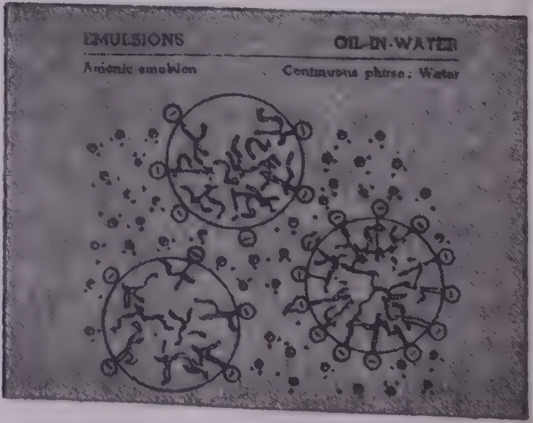
If the lipophilic oily part of the molecule predominates, the surfactant is suitable for emulsifying small amounts of water in a continuous oil phase.

If the hydrophilic part predominates, it can form oil-in-water emulsions, serve as wetting agents and, if the amount of hydrophilic group is high enough, it can serve as a dispersing agent or as a solubilizing agent.

The proportion of hydrophilic part to lipophilic part is known as the HYDROPHILIC LIPOPHILIC BALANCE, and this can be determined analytically to give an HLB VALUE.

HLB value	Application
3 - 7	Water in oil emulsions
8 - 16	Wetting agents, oil in water emulsions
13 - 19	Solubilizers, dispersants





Different fats have been found to

eed different emulsifiers.

il Type	Required HLB value
eef tallow	8-10
tearic acid	13.5
leic acid	15.5

Beamhouse operations clearly equire similar lipid material to be mulsified and dispersed. In addition he non-leather-making matter comrised of mucoid and protein lecomposition products has to be lispersed. We can extend KEMP nd STAINSBY's statement to say hat variation in mucoid and lipid ontent interferes with the production of uniform leather quality.

There are clearly a great many actors in the selection of the most suitable surfactant for use in the beamhouse. Not least because application of higher amounts of unsuitable surfactants lead to loose grain and sensitivity of the grain to water absorption and swelling during finishing. Your supplier should be in a position to advise you.

Liming, deliming and bating

* Objective: prepare pure, clean, well separated, well degreased fiber weave.

Besides the removal of the hair and solubilizing of the epidermis, the process causes the hide structure to absorb water and swell, fibres to get separated and the natural fat, eleased from fat cells, is saponified. f the alkali does not penetrate uniormly, the structure swells unevenly, causing a shrunken grain to develop.

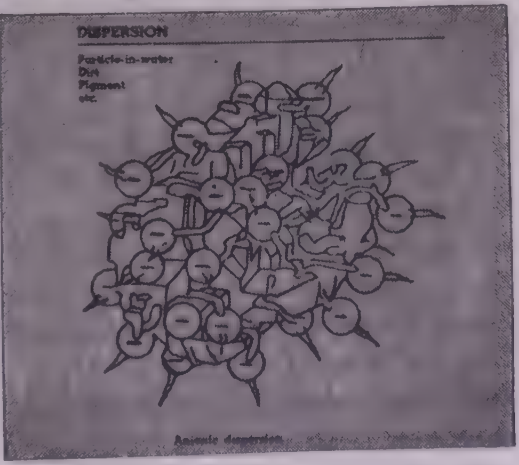
The use of surfactants helps the iming chemicals to penetrate uniormly, allowing even swelling and uniform opening up of the fiber strucure. The fat cell membranes are more quickly broken down, and the fat saponified and emulsified. Together with the keratinous residues, a slippery surface is induced which reduces friction in drum liming. This prevents chafe marks and sueded grain.

Further advantages to the incorporation of surfactants are:

- less fat on the fleshing cylinder knives
- cleaner flesh side
- squeezing/samming felts have longer life.

In bating, you should consult your supplier to see if your surfactant has affinity for the enzyme, or you can check it with the Standard Casein Number test (with and without the surfactant). Logically if the enzyme reacts with the surfactant, its activity will be lost -- therefore, instead of promoting uniform bating, the surfactant will actually hinder it.

By use of a suitable surfactant in bating, a more intensive dispersion of fats, protein decomposition products and pigment scud is formed. This can be easily washed off with water at 95°F.



In general, beamhouse surfactants have to display the following properties:

* stability to electrolytes and extremes of pH
* low substantivity to the collagen
* high wetting, emulsifying and dispersing power
* good biodegradability
* low foaming.

Intensive cattle feeding is increasing the fat content of bovine hides, making careful selection of the soaking auxiliary still more important.

Where exceedingly high content of fat is found in the skins, a specific degreasing process has to be included. The old kerosene plus emulsifier system has had to be discontinued due to ecological considerations. Fortunately aqueous methods have proved satisfactory.

A preferred method involves the simultaneous penetration of the skin with emulsifier and the raising of the shrinkage temperature of the collagen to ca. 175°F. Several hot washes (at 140°F) -- well above the melting point of the fats -- achieve an efficient removal of the fat emulsion produced within the skin.

Control Points for consistent quality:

* Condition of the raw material (how greasy?)
* Temperature and time -- maximum liming temperature 86°F. maximum bating temperature 97°F.
* Addition of surfactants
* Drum speeds
* Drum dimensions
* Water quality (dissolved CO_2 in wash water)
* Air quality (proximity of solid fuel or oil fired boilers producing CO_2)
* Ageing of limed hides, before and after fleshing
* Covering of limed hides to prevent lime blast
* Handling of limed hides should avoid dragging grain down over floor or other surfaces.

- Cold water (80 deg.F max.) to delime the grain before proceeding to warm washing and warm bating at 97°F
- End point of bating: mobility and removal of natural pigment

  - thumb print impression
  - air permeability.

Pickling and tanning

Due to the controls being placed on neutral salts in the effluents, either recycling systems or low, float systems are being adopted. With low float, the salt concentration in the pickle can be maintained. To avoid heating up running times have to be reduced. Suitable surfactants speed up the distribution of the pickle system and the amount of drumming can be reduced.

Despite the emphasis on grease dispersing during beamhouse processing, residues of fat and fatty acids remain to impede the uniform uptake of acidity and chrome. The presence of even small amounts of fatty acids result in soap formation with the trivalent chrome. These insoluble, sticky compounds, even if present as traces on the collagen fibers, interfere with the diffusion of the tanning salts into the pelt fine structure. After drying, the fibers which have undertanned zones present a stiffer, more parchment like property. In order to achieve the necessary leather quality, more softening fatliquor and more chrome salt are needed; something one is reluctant to adopt in the face of effluent controls.

The solution is the use of a very specific dispersant for chrome and chrome soaps, applied shortly before the addition of the chrome. Unfortunately normal disersing agents will not deal with such a substance; the special product is amphoteric in character and operates in acid pH. Used in the pickle it disperses the residual fats and promotes the penetration of the acid. In chrome tanning it disperses the chrome soaps as they are forming and even after they have formed.

The benefits observed are: extra softness, regular handle, uniform dyeings. All the benefits flow from uniform chrome distribution. As a result of the extra softness, regular fatliquoring can be reduced, with consequent improvement in the lightweight handle and drape of the leather. This change in chrome tanning has permitted fatliquor reduction of up to 30% and brought leather, especially for vulcanized shoes, well under the 3% extractable fat limit set by the shoe industry (SATRA).

The presence of such an amphoteric auxiliary in chrome tanning was demonstrated by CASNOCHA to make a marked contribution to the even distribution of chrome through the central zones of the leather structure. This overcomes the tendency for the center layers to be deficient in chrome -- a fact noted by KRITZINGER and THEIS. As mentioned in considerations of dyeing and fatliquoring, the distribution of tanning and retanning agents has a direct impact on the Iso-Electric Point of the collagen -- that is upon the uniformity, throughout the cross-section, of dissociated, active charge. Graded zones of IEP resulting from irregularly penetrated chrome, retans, etc. cause difficulties in the uniform penetration of fatliquoring and dyes.

STRUDWICK, in support of the use of amphoteric speciality auxiliaries in chrome tanning, quoted the positive experience of English tanners in their quest to achieve uniformity and quality of production, even in the processing of wet-blues where the initial tannage was performed without such precautions.

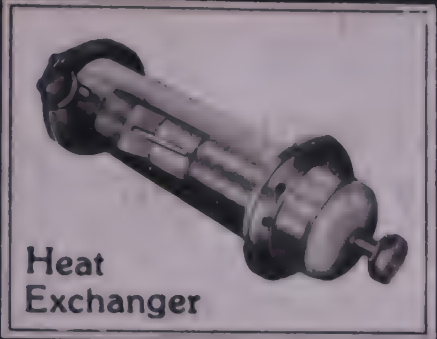
"Uniformity of shade from skin to skin is imperative and, although to some extent dependent on fiber structure (age and breed), uniform distribution of chromic oxide and the effective chroming of the fibers greatly assist level dyeing. I also believe that where it is present in a rechroming process there is greater latitude of control: if, for example, some errors occur in too rapid addition of the alkali during basification, the dispersing effect on the basic chrome tanning complexes prevents actual precipitation."

The importance in self-basifying systems based on the gradual solubility of calcium and magnesium oxides is self-evident.

Control Points for consistent quality:

- Consistency of preceding processes
- Salt concentration and S.G. in solution (Be)
- Temperature and time
- pH/time profile
- Drum speeds
- Drum dimensions
- Use of amphoteric speciality auxiliary
- Consistent accurate basification
- Shrinkage temperature
- % Cr_2O_3 in leather
- % Cr_2O_3 in exhaust float.

(To be continued)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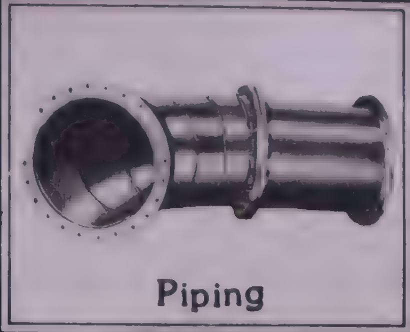
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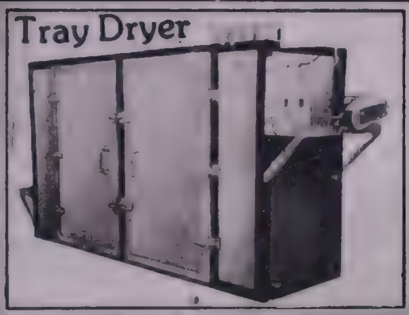
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LEATHER ABSTRACTS

ZOMETAL COMPLEXES FROM RED ONION SKIN *LLIUM CEPA)* TANNING EXTRACT CONDENSA- ON PRODUCTS, O. Akaranta and T.O. Odozi, *J. eath. Research* **3,** 82, 1987.

Condensation of the red onion skin tannin extract with rmaldehyde is carried out to yield resins which are then oupled with a diazonium salt to give tannin formalde- yde azo compounds. The tannin-azo metal complexes ave promising properties as pigments in surface coat- gs.

ERSPIRATION FASTNESS OF LEATHER DYEING, . Schone, *Das Leder,* **38,** 66, 1987.

Particular problems are met in dyeing deep shades f dark brown, blue, red and black, when at the same me satisfactory perspiration is demanded. The follow- g measures have a decisive influence on the results- pplication of fixing agents; strict control of the dyeing rocess; the effects of rinsing and the selection of suit- ble dyestuffs, the latter promising the most significant uccess.

PENING OF HIDE WITH ENZYMES, E. Heidemann nd E. Ligonis, *Das Leder,* **38,** 21, 1987.

Calf skin bits may be opened by proteolytic enzymes ithin some days so that it swells to a plastifiant mass ith the aid of a diluted acid at a pH of 3.5. This mass issolves to a gelatine of high boom value at a temper- ture of 70°C within an hour.

OOT DYNAMICS - AN INSIGHT INTO THE RELA- IONSHIP BETWEEN FOOT AND SHOE, C. James, *he Shoe & Leather News,*21, July 30, 1987.

The anatomy of the foot deals with the static or struc- ral foot and foot dynamics deals with the functional ot, its mechanics, movements and action. The four otions; extension, flexion, inversion and eversion are nportant to the foot's functional health and it is vital that is kept mobile to carry out its dynamic functions.

ONTRIBUTION TOWARD A TANNING PROCEDURE FREE OF CHROME, M.Siegler, *J. Am. Leath. Chem. ssoc.* **82,** 117, 1987.

This paper is a new contribution toward a tanning free chrome procedure and describes different tanning gents which are liekly to become the universal tanning accepted in the next century. The proposed new combined tanning procedure, chromium free or low chrome, includes three major phases; pretanning, tanning and retanning (including coluring and fat liquoring).

EFFECT OF MODERN TANNING METHODS OF TANNERY EMISSIONS, W. Luck, H. Rosentreter and B. Williams, *J. Am. Leath. Chem. Assoc.* **82,** 125, 1987.

The advantages of high exhaustion chrome tanning processes over conventional tanning methods with regard to the chrome emission are shown both for wet blue producers and processors. Attention is drawn to the importance of the washing of the chrome leather after tannage and the effect of this emission ofchrome and salts during the processing of wet blues.

INNOVATIVE TANNAGES FOR IMPROVES LEATHER, *J. Am. Leath. Chem. Assoc.* **82,** 166, 1987

In this paper, an attempt is made to put forward some of the recent innovations in leather science like oxazolidine polycarboxylic acids for low chrome and hydrothermally stable leather, chrome-aluminium-polycar boxylic acid for practically chrome free tannages and various applications of fat liquors, for improved leather.

SOLVENT PRESERVATION OF PIG SKINS, P.R. Buechler, J.S. Fisher, M.P. Dahms and M.V. Hanningon, *J. Am. Leath. Chem. Asso.* **82,** 200, 1987

This paper presents two processes which yielded dehydrated pig skins that could be made into desirable leather products. Dehydrations bated stock offers a number of advantages: (1) A light-weight product, one sixth of the shipping weight of fleshed raw skins; (2) Processed skins with an indefinite storage life; (3) Grading on the basis of its visible surface defects; (4) Rapid wetting bark; (5) Better appearance and better physical properties than the conventionally processed pig skins.

APPLICABILITY OF FLUORO CHEMICAL COMPOUNDS WITH CARBOXYL GROUPS WITH LEATHER WATER PROOFING PROCESS, E. Gratacos, A. Marsal and M. Fort. *J. Am. Leath. Chem. Assoc.* **82,** 212, 1987.

The possible compatability of a fluorocarbon compound in leather water proofing processes with non-fluorinated carboxylic acids is studied. This is a chromium complex of a fluorinated compound, which can be used as a fixing agent for mono-carboxylic acids in place of the conventional chromium salt. Another fluorocarbon compound, which, as a result of the carboxylin groups in its constitution, could eventually be used in places of the conventional mono carboxylin acids in the afore mentioned water proofing processes. The ageing of the treated leather increases the water proofing properties of the leather.

A SIMPLE METHOD FOR THE COMBINED DETERMINATION OF BOTH ZIRCONIUM AND ALUMINIUM IN LEATHER AND TANNING SOLUTIONS, L.J. Stephens, *J. Soc. Leather Tech. Chem.* **71,** 10, 1987.

A method is developed to determine both zirconium and aluminium with one simple titration. Results at the concentration of 1M zirconium and 1M aluminium showed that aceptable accuracy could be obtained from a combined stage titration with EDTA using xylenol orange as indicator. The method involves titration to an end-point at pH 1.0 for zirconium and then raising the pH to 3.0 for aluminium. Determination of zirconium alone in the presence of aluminium can also be performed using a modification of the method recommended for leather, without the need to remove the aluminium present by controlling the pH of titration to 1 - 1.5.

UTILISATION OF HIDE WASTES FOR THE PRODUCTION OF HIGH PROTEIN FEED MEALS ON THE BASIS OF 'COLLAGEN AMINO ACID INDEX', J. Zuchowski, *J. Soc. Leather Tech. Chem.* **71,** 15, 1987.

As much as 50% of hide substance becomes waste material and this paper deals with a study on the proper utilisation of hide wastes. It is stated that the processing of hides into protein feeds should be based on comprehensive indices of the quality level assessment of the raw material as well as of the end product.

Processing based on 'collagen amino acid index' makes it possible to achieve the following objectives.

-- to choose accepted hide material for processing purposes

-- to design the manufacturing process properly

-- to obtain protein feed meals of adequate nutritive value and utilise the remaking hide wastes efficiently.

HIGH PERFORMANCE ACRYLIC RESINS FOR LEATHER II -- ACRYLIC TOP COATING SYSTEMS, J.J. Biles, N.J. DiCandilo and W.C. Prentiss, *J. Am. Leath. Chem. Assoc.* **82,** 65, 1987

This paper identifies a family of safe, non-toxic acrylic emulsion top coats offering a range of performance properties and favourable economics which are applicable to soften the leathers of today's leather market. Their key properties feature attractive product characteristics such as low emissions and non-combustibility as well as numerous application and finished leather benefits. They offer levelling and dyeing properties which make them suitable for conventional spray application as well as application by roll coater.

DRYING WITHOUT HEAT, J. Gilet, *J. Am. Leath. Chem. Assoc.* **82,** 61, 1987.

This paper expresses the positive and negative effects of the use of microwave energy to dry wet leather after setting out an aqueous base coat and protease finishes. Effects on leather structure and chemicals used in tanning, retanning and finishing are considered.

COLLAGEN CROSSLINKING; NEW BINDING SITES FOR MINERAL TANNAGE, N.A. Evans, B. Milligan and K.C. Mantgomery, *J. Am. Leath. Chem. Assoc.* **82,** 86, 1987

Treatments capable of covalently binding aromatic, 1,2-dicarboxylic acids to collagen are described. Aluminium tannage of the modified collagen produces white leather with good thermal and dye bath stability, in contrast to that produced by similar tannage of immobilized collagen. However, the treatment also results in excessive swelling and reduced due affinity. The aromatic 1,2-dicarboxylic acid groups also act as stray binding sites for chromium, but not for titanium or zirconium. The shrinkage temperature of the modified collagen, after chrome tannage, is exceptionally high, whereas the thermal stability after titanium or zirconium tannage is little different from that attained by similar tannage of untreated collagen.

THE CHARACTERISATION OF ACRYLIC SYNTANS FOR RETANNING CHROME LEATHER, W.C.Prentiss and C.J. Ward. *J. Am. Leath. Chem. Assoc.* **82,** 96, 1987.

Different acrylic syntans in terms of their ability are characterised. The behaviour of these products on chrome leather is also explored. Some guidelines for the selection of products for retanning are suggested.

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NEW PRODUCTS

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Paule Chemical has developed Calftone top spray nd Frogsas finish system. Calftone is a wax type spray o be used on calf, side and some synthetics. It has a nedium fill and will not overfill a tight grained calf leather. Frogsas' cream is compatible with the newer waterproof eathers. It helps to style leathers without sacrificing the eather properties and actually improves the inherent roperties of the water proof leather.

Footwear Manufacturing, **180,** 1987.

FOOTLITES - NEW INSOLES

Footlites odor absorbing insoles, developed by United oam Plastics Corporation, are found to be 3 to 5 times nore effective than the competitive products in odor bsorption. They are available in several designs nolded to fit athletic, casual and walking shoes.

Footwear Manufacturing, **180,** 1987.

A NEW BIOCIDE

Parmetol PF 19 developed by Sterling Industrial prevents the degradation in water based paints, dyes, adhesives, scalants and other aqueous systems. It is effective relatively at low concentration levels - 0.1 to 1%. It is unaffected by oxidising agents and is suitable or both ionic and non-ionic compounds.

Leather, July, 1987

NEW SOLVENT

A new propylene glycol mono ethyl ether, marketed under the name Arocosolv PE,can be used as a solvent for a variety of natural and synthetic resins and its main applications include lacquers and coatings for eather.

Leather, April, 1987.

RUBBER SOLING COMPOUND

Garaflex 900, a high performance soling compound having the superior performance and appearance of higher-priced vulcanised rubber has been developed by Gary Chemical. It offers durability, long wear, skid resistance, lower cost and is ideal for soling applications in deck shoes, casual shoes, hiking boots and work boots.

American Shoe Making, **361,** 5, 1987.

APAR COMPOSITE MATERIAL

Apar, a unique composite material is now being marketed to footwear components makers and shoe and boot manufacturers. When compared to sheep skin, it cools down two times faster than sheep skin in summer, warms up 30% faster in winter, while keeping the wear 30% drier all year round.

American Shoe Making, **361,**5, 1987.

NEW CATIONIC FATLIQUOR - ATLASOC KCP

The newer synthetic cationic fat liquor, introduced by Atlas Refinery Inc. USA is designed to improve the softness, tensile and tear strength of the leather when applied during chrome tanning and retanning stages. Also it promotes an even distribution of fat and chrome throughout the cross section and prevents the leather from becoming entangled in a short float.

The Leather Manufacture, **105,** 5, 1987.

PORELLE -- WATER PROOF FILM

Porvan has launched a new product Porelle which is a water proof film that breathes. Being a microporous film, it allows transmission of water vapour inside a garment while providing water-proofness and is also inherently wind-proof. It is supplied in rolls and has already found application in some shoe making materials. It can be used with a variety of lamination techniques. It is highly extensible and has excellent abrasion resistance. It also performs well at sub-zero temperatures.

Shoe & Leather News, July 1987.

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- Di-Sodium Phosphate Anhydrous
- Tetra Sodium Pyro Phosphate-Anhydrous
- Tetra Sodium Pyro Phosphate-Crystals
- Tri Sodium Phosphate-Crystals
- Tri Sodium Phosphate-Anhydrous
- Mono Calcium Phosphate
- Di-Calcium Phosphate-$2H_2O$/Anhydrous
- Tri-Calcium Phosphate
- Mono Potassium Phosphate
- Di-Potassium Phosphate
- Tri-Potassium Phosphate
- Tetra Potassium Pyro Phosphate
- Potassium Tri Poly Phosphate
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LEATHER NEWS -- INDIAN

RS. 50CR. BUSINESS IN PARIS LEATHER FAIR

Business worth over Rs. 50 crores was transacted by Indian articipants at this year's Semaine-Du-Cuir fair in Paris held st month, according to rough estimates made by the Coun- for Leather Exports (CLE).

Of this nearly 40 per cent was accounted for by various ather products. The trend revealed a very strong demand r shoes, shoe uppers, leather garments and hand-bags, ccording to a CLE press release.

A significant factor which emerged during the fair was the ming up of the trend for increased leather import by the South ast Asian countries from India and a decline in demand for ather from some European Countries and the US. On the ther hand, there was a pick-up in demand for leather pro- ucts such as shoes, garments and bags from the European nd Scandinavian countries.

A special feature of this year's fair was an 'India Evening' rganised by the embassy in Paris. A seminar was conducted s part of the programme which provided an opportunity for uyers from other countries to get a glimpse of the latest devel- oments in Indian leather industry.

The Council also participated in the Pre-a-Porter Feminin ir in Paris for the first time. This was mainly to exhibit some the new styles developed by Ms. Marie Francoise Arnaud, French designer who visited India recently and worked with ome manufacturers here.

The products received critical acclaim and some of the lead- g French names in the field evinced keen interest in them. oing by the number of enquiries made by the buyers, it is xpected that good business will be forthcoming in the near ture.

The GDS international footwear fair in Dusseldorf was yet nother fair in which the Council participated last month. Good rders were procured by the exporters for ladies and gents hoes. The demand was particularly strong from West Ger- any followedl by France, the UK, and Denmark. Also, a umber of enquiries were received from Australia, Canada and e US.

Meanwhile, a delegation of leather garment exporters led Mr. A. Sahasranaman, Executive Director, CLE, visited New ork, Los Angeles, San Fransisco and Dallas in the US cently and met leading importers and retailers there.

Presently, the US imports roughly Rs. 500 crores worth of ather garments, of which South Korea accounts for nearly s. 300 crores. In the wake of the recent disturbances in South orea and the rising wage levels there,the US importers have started looking for other sources of supply.

The samples shown by the Indian delegation were highly appreciated by buyers of departmental stores and other importers and the prices quoted were considered to be acceptable, according to CLE. It is expected to result in substantial business in the near future.

During this year itself, the export of leather garments to the US is hoped to reach a level of Rs. 10 crores from Rs. 3 crores last year and within another two years, it is slated to top at least 50 crores.

RAW ITEM SHORTAGE HITS LEATHER EXPORT

Exporters of leather products are facing acute shortage of raw materials. According to the Indian Leather Products Association (ILPA), supply of good quality leather with right finish is irregular and inadequate, and manufacturers are finding it difficult to meet the export commitments.

One of the main reasons for the shortage of good quality leather, is that the technology used by the tanners is outdated and they could not make leather of right finish. Apart from this, there is also large-scale illegal exports of semi-finished leather (crust) in the form of finished leather. The association feels that there should be a ban on such exports.

It is also suggested that the exporters, who are solely engaged in the business of finished leather should be allowed to import hide under OGL and re-export them as finished leather or as products. Allowing manufacturers to import finished leather to meet the raw material requirement is not a final solution, says Mr. T.S. Malik, Chairman of the Indian Leather Products Association (Western Region). This is because the landed cost of imported material is very high compared with the local products.

A definite policy ensuring adequate availability of raw materials is necessary as export of leather products is poised for a big leap. Although the Council for Leather Export is expected to play an important role in this, its functioning as export promotion body has left much to be desired. As Mr. Malik points out, the council has been reduced to the level of "family enterprises running for the benefit of its office-bearers".

The Council is not extending any real service to the exporters and that led the exporters to form their own association. Besides, the raw materials, various accessories such as zips, press buttons, rivets, magnetic buttons etc. used for making leather products are also not available at reasonable prices. Although there is a move to import these items by the State Trading Corporation, it remains to be seen how this would benefit the manufacturers. The Association has also suggested setting up of leather zones in Madras, Bombay, Calcutta, Kanpur and Agra, with a view to reorganise the industry.

LEATHER EXPORTERS TOLD TO ADOPT RIGHT TECHNOLOGY

The Council for Leather Exports (CLE) has warned exporters that there was danger of India's share in global market coming down, unless the leather industry adopted right technologies for production and achieved higher levels of productivity immediately.

The warning came from Mr. A. Sahasranaman, executive director of the CLE who cautioned exporters against being overtaken by complacency following the quantum jump in export earnings during the last two years. He was speaking at a seminar on productivity improvement-action plan formulation for leather and leather products, co-sponsored by National Productivity Council (NPC), All India Skin and Hide Tanners and Merchants Association and the CLE.

He pointed out that the goal of achieving Rs. 6000 crores worth of exports from the leather sector by the turn of the century could prove elusive unless "we are prepared to tighten our belts and do everything to increase productivity." Failure to increase productivity would lead to India losing its "competitive edge" and "we will be landing ourselves in serious difficulties" despite the huge investments that have been made in modernising and expanding production facilities in the last few years.

Mr. Sahasranaman said countries like USA, West Germany, France were finding it difficult to produce leather articles competitively because of high cost of raw material, labour and tendency among the labour-force to shirk such low-tech industries. As a consequence they were looking at different parts of the world for procuring the best products at the least cost for themselves. The whole world was before them to choose their suppliers and major Indian competitors were South Korea, Hong Kong, Taiwan, Brazil and Argentina besides Portugal and China.

"Our advantage in terms of wage differential is irrelevant. This is in fact what is happening today. Despite the fact that Indian leather is cheap, because we are not able to provide the market with constant quality on a regular basis, we are not able to get a better share of the market." Lack of good production planning, proper equipment, absence of training of workers, quality control and good managerial practices in regard to inventory control were the major factors hindering productivity. If India was to become a big force in the world of leather goods exports, which was possible given "our endowments" it would require hard work and concentrated efforts towards improving productivity.

Agreeing with Mr. Sahasranaman, Mr. C.K. Duraivelan, President of All-India Skin and Hide Tanners Association, said compared to the productivity of labour in advanced Western countries and even in Fareast countries such as Korea and Taiwan, Indian productivity was low. The apparent cheapness of Indian labour was therefore offset by its productivity.

He said his association proposed to undertake a survey on the modernisation and productivity in the leather industry. However, labour productivity was not the only factor which could contribute to increase in productivity. There was need for replacing the existing family oriented and personalised management of the industry with professional management to plan and organise productiion in a scientific way. Provision of adequate working capital, proper cash flow, correct pricing, good marketing and supply of adequate powers were also factors which contributed to increased productivity.

Dr. G.K. Suri, Director-general, MPC, in his keynote address observed that with all the investments made India still remained a major exporter of leather. Judging from the contemporary trends there was need for technology updating, market development and shift of emphasis from leather exports to high value-added products. Action plans for this purpose should be formulated by different groups interested in leathers such as workers, trade union representatives, employers, consulting and Government agencies.

EXPORT DUTY LIKELY ON FINISHED LEATHER

The mechanism of export duty is the instrument on which the Union Commerce Ministry is expected to bank upon for regulating the exports of finished leather, in preference to a quota system. It is learnt that a proposal to levy a 7 per cent export duty is already under the consideration of the ministry, but no final decision has been taken for two reasons.

One reason is that measures to fight the drought situation have taken predominance over other matters. The other reason which is put forward by leather industry sources at Madras is that though the overall market trends abroad are strong, there have been some disquieting signals on the leather export front which indicate export earnings may not show a sustained growth. In such a situation, any move to curb the existing levels of export could become counter-productive which is why the ministry has held back its hands, the sources say.

The move for regulating finished leather exports followed demands from product manufacturers who advocated curb on finished leather exports with a view to improving the domestic availability and bringing down the price. Since it is the policy of the Government to secure more value added exports the ministry examined three proposals for curbing finished leather exports -- fixation of floor price, imposition of quotas or clamp export duty. The first two proposals have been dropped as impractical. The other suggestion for voluntary curbs on exports has also been given as an unworkable proposition.

Meanwhile, a task force set by the National Productivity Council on productivity improvement in leather industry has identified that working capital management is one of the problem areas in the industry. It has recommended that a centralised body should be entrusted with the study to determine the cause of industrial sickness in leather units and suggested ways for revival. To tide over the anticipated raw hides and skins which is expected to be in the region of 200 million sq. feet by 1989-90, the task force has suggested a judicious substitution of synthetic materials for footwear and other leather items should be encouraged.

LEATHER NEWS -- FOREIGN

WORLD HIDE AND SKIN PRODUCTION

The likely pattern of development in the world leather industry to 1990, according to a global analysis of the world hides and skins and derived products economy produced by the FAO n Rome is slower growth in world production of cattle hides and calf skins; higher in world production of sheep skins, lamb skins, goat and kid skins and demand for leather outshipping availability by around 10%. (*Leather*, August 1987).

USA LEATHER INDUSTRY

Effluent costs, cheap imports and the high dollar value have taken their toll of weak American tanners, leaving a strong industry, which though smaller than it once was looks likely to survive. Of 342 plants operating in 1982 only 140 are now left according to the Government publication, with employment down from 16,200 production workers in 1982 to 11,900. However, despite a fall in leather production from 1502 M in equivalent hides in 1985 to 14.5 M in 1986, exports was significantly in 1986 and this is likely to continue in 1987 with export sales upto 42% in the first quarter of this year compared to the same period last year. (*Leather,* August 1987).

LEATHER 88

Hong Kong's 5th International Leather Exhibition is being held between 25th to 28th May 1988 at the Hong Kong Exhibition Centre. This exhibition now ranks as the second most important event in the leather industry worldwide. For details contact International Leather Exhibition Ltd., 4306, China Resources Building, 26, Harbour Road, Hong Kong.

SHOE IMPORTS FROM CHINA TO UK

Increasing shoe imports from China and other Far Eastern countries are adding to the problems of an already troubled British Footwear Industry. According to British Footwear Manufacturing Federation, China has sent over 5108 m pairs of shoes, an increase of 152% on last year, between January and May. Taiwan boosted exports during the same period by 34% to 12,758 m pairs, South Korea by 42% to 7996 m pairs, Thailand by 93% to 2814 m pairs and Hong Kong by 6% to 7.24 m. pairs. (*Shoe & Leather News*, August 1987).

NEW HEIGHTS FOR 88 FOOTWEAR

The big news is heel heights, the higher the better. Accordng to retailers 21/8 is now the volume seller for career women whereas this was considered very high or special occasion. The women who wore 18/8 will move upto 21, the 21/8 cusomer will move to 24 and so on. (*Accessories*, **88**, 8, 1987).

SHOE INDUSTRY IN ITALY, 1986

After two years of growth, industrial production underwent a marked counteraction, dragged down by a recession of the export trend, by a new decline in domestic market and by an increasing threat from imports. A summary tale of falls in exports is given below:

Place	**Percent fall in Exports**
Eastern Europe	28.9
Soviet Union	41.2
North America	16.3
U.S.A.	17.9
Central & South America	13.9
Africa	38.0
South East Africa & the Far East	10.9
Oceania	12.8

(*Footwear Digest International*, July/Aug. 1987),

SHOES GALORE

A United Nations body has forecast that by 2000 the world will be using 3-4 1/2 billion more pairs of shoes, and it means that the extra demand in the foreseeable future will be equivalent to the total current footwear production of Asia. (*Australian Leather Journal*, **90**, 1987).

VINYL HANDBAG

The growth in vinyl hand bags has been incredible and it is attributed to a combination of factors including -- updated styling; the rising cost of leather; improvements in the look and hand of vinyl and the overwhelming success of certain vinyl-lines that have removed the stigma of carrying a leather 'substitute'. Further vinyl hand bags are more desirable due to their affordability and a customer can get the look of leather at a third of the price. The most popular looks include pebble grain, mock croc and ostrich. (*Accessories*, August 1987).

EFFLUENT TO FERTILISER

A new use for tannery sludge, animal and slaughter waste is to feed it to worms which in turn produce worm castings for agricultural use. SA2 Pontesuero, Italy now offers a patented Air system for achieving the conversion. This is basically a cylinder-shaped tank with a permeable membrane at the bottom and a shading net at the top. Sludge is poured into the tank at set intervals and the red worms eat it, eliminating 60% and converting 40% into worm castings. (*Leather*, April 1987)

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STATISTICS

US HIDE STOCK, POPULATION AND SLAUGHTER (1982-1987)

	Cattle		Hogs & Pigs		Sheep & Lamb	
	Total Number	Fed. Insp. slaughter	Total Number	Fed. Insp. slaughter	Total Number	Fed. Insp. slaugher
1982	115,444	33,907	54,534	79,329	12,997	6,274
1983	115,006	34,816	56,694	84,761	12,140	6,412
1984	113,700	35,880	54,073	82,478	11,487	6,549
1985	109,749	34,765	52,298	81,497	10,493	5,976
1986	105,468	35,913	50,960	77,290	9,983	5,464
1987	102,031				10,328	

US TANNERS PRODUCTION OF LEATHER TYPE -- UNIT 1000 HIDES

	1982	1983	1984	1985	1986
Total Shoe Upper	20,921	20,865	18,199	16,126	15,217
Dress Shoe Upper	17,956	17,884	15,808	13,655	13,322
Lining	462	460	453	445	447
Work Shoe Upper	2,503	2,521	1,928	2,026	1,448
Cattle hide Glove & Garment	1,788	1,995	1,867	1,789	1,919
Miscellaneous Cattle hide	1,179	1,307	1,181	1,144	1,171

US PRODUCTION OF NON-RUBBER BOUTS & SHOES - UNIT 1000 PAIRS

	1982	1983	1984	1985	1986
Men's Dress	58,390	57,971	53,702	47,094	46,767
Work	21,357	17,646	18,571	16,765	13,727
Youth's/Boy's	9,388	8,983	6,669	4,543	2,458
Infants & Babies	25,435	21,451	19,886	21,082	18,470
Children's	13,202	10,518	9,414	7,928	7,420
Women's	142,516	153,684	113,282	95,697	83,367
Misses	8,536	7,676	4,880	4,399	5,721
Athletic	19,866	18,307	12,760	10,813	6,835
Slippers	54,041	57,692	59,415	54,421	42,416
Others	6,396	5,254	4,595	2,732	6,284

(*Leather*, August 1987)

1985 RESOURCE FLOWS, LEATHER AND FOOTWEAR AVAILABILITY - BOVINE

	Bovine Hides			Light Bovine Leather			Leather Footwear		
	Kill m. hides	Exports K. tons	Imports K. tons	Production m. sq. ft.	Exports m. sq. ft.	Availability m. sq. ft.	Production m. pairs	Exports m. pairs	Availability m. pairs
USA/Canada	42	750	80	760	201	806	250	3	697
W. Europe	37	665	770	2283	1276	2340	889	515	767
USSR/E.Europe	51	-	173	1397	3	1500	1056	83	1054
Argentina	12	5	-	410	253	153	34	-	34
Brazil	10	10	-	310	150	210	220	120	100
Mexico	4	-	65	275	5	290	45	3	42
India	35	-	-	680	111	567	268	10	280
Korea	-	-	155	210	8	520	115	99	16
China	3	-	95	385	26	403	240	84	156
Japan	2	-	225	238	218	30	43	1	44
Australia/NZ	10	115	-	55	49	30	21	-	25
Africa	13	45	10	170	29	171	57	6	57
South Africa	3	15	-	49	3	68	32	-	35
Hong Kong	-	4	5	25	283	130	4	6	5
Pakistan	5	-	-	122	78	44	40	-	40
Near East	12	23	49	252	4	262	179	6	182
World	271	1690	1700	8210	2580	8100	3662	930	

BOVINE HIDE & SKINS PRODUCTION & AVAILABILITY
('000 metric tons)

	1965	1985
Developing Countries		
Production	1368	1773
Imports	104	383
Exports	313	131
Availability	1158	2100
Developed Countries		
Production	2490	3020
Imports	1078	1215
Exports	825	1548
Availability	2742	2687

LEATHER MARKET-BREAKDOWN
('000 m. sq. ft)

	Light Bovine	Sheep & Goat	% used in footwear	
			Bovine	All
World				
1970	6.3	2.8	73	51
1985	8.1	3.0	68	49
Developing Countries				
1970	2.1	0.5	54	43
1985	3.4	0.9	62	49
Developed Countries				
1970	4.1	2.2	83	54
1985	4.8	2.1	72	49

(*Leather*, July 1987)

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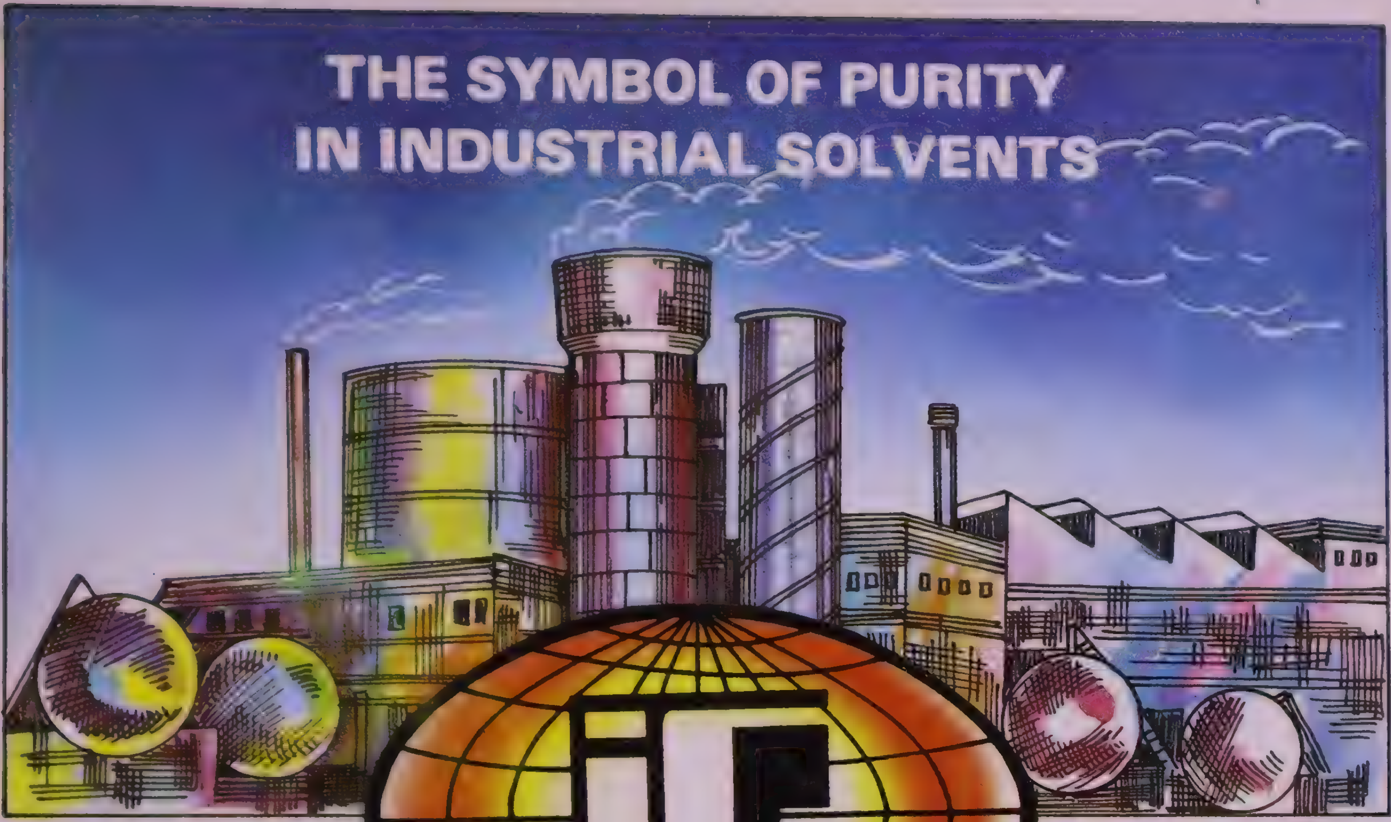

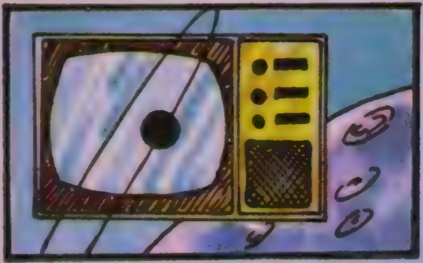

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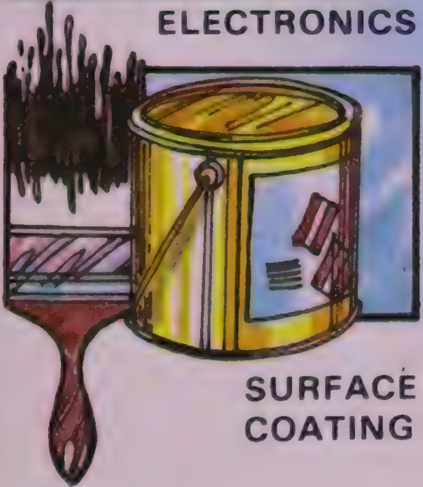

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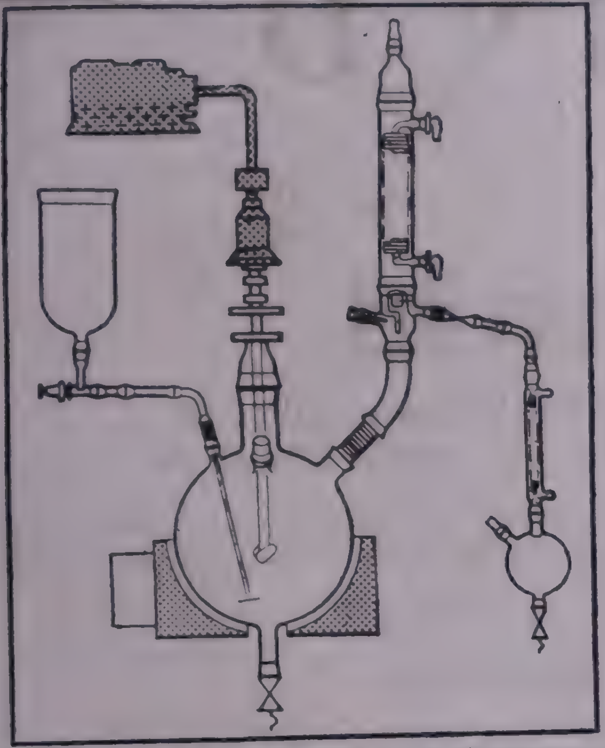

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MARKET INFORMATION

MEK up

The prices of methyl ethyl ketone and cyclohexanone shot up by Rs. 2 per kg. In the Bombay Chemicals Market. This was attributed to seasonal demand. Oxalic Acid marked Rs. 25 per kg.

The oncoming festive season has steadied the market with no major commitment. Caustic and soda ash were brisk. Other items retained previous level.

The dyes section was better with demand picking up in all varieties of dyes. Shortage continued in major intermediates like Rhoduline & Tobias owing to large scale export tie up.

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and a seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

(Prices as on 8th October 1987)

INDUSTRIAL CHEMICALS	Per kg.
Ammonium sulphate	2.00
Ammonium phosphate (Mono)	14.50
Ammonium phosphate (Di)	12.00
Ammonium carbonate (Di)	17.00
Ammonium bicarbonate	4.75
Ammonium chloride	5.75
Ammonium nitrate	4.50
Arsenic white powder	21.00
Acrylamide	57.50
Barium carbonate	6.00
Bleaching powder (33% Cl)	4.00
Borax (Granular)	14.00
Borax (Powder)	15.50
Boric acid (Tech.)	22.00
Bisphenol-A	60.00
Butyl carbitol	35.00
Caustic soda (Flakes)	7.60
Caustic soda (Solid)	7.75
Caustic soda (Lye)	6.00
Calcium chloride 70% (solid)	3.25
Calcium chloride 75-80% (fused)	3.50
Calcium chloride 96% (Anhydrous)	5.00
Calcium carbonate (PPT)	3.00
Calcium carbonate (Activated)	3.55
Camphor (Indian)	86.00
Cresylic acid	49.00
Cream of Tartar (Tech.)	64.00
Citric acid (Belgium)	40.00
Citric acid Indian	40.00
Copper sulphate	15.75
Chromic acid	40.00
Cyanuric chloride	95.00
Cobalt oxide	280.00
Carbitol	54.00
Dicalcium phosphate (Anhydrous)	16.00
Ferric chloride (Lumps)	5.50
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Glue flakes	8.45
Glue sheets	6.75
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Menthol crystal (Flakes)	215.00
Menthol bold	235.00
Menthol crystal bold	375.00
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	15.00
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Mercury (75 lbs)	5,500.00
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(Prices as on 8th October 1987)

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Acid Orange II	77.80
Acid Orange IIY	63.05
Acid Red A	107.25
Crosein Scarlet MOG	155.00
Acid Scarlet 3R	99.90
Acid Red 38N	135.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Green V	330.00
Acid Patent Blue AS	250.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	121.95
Acid Black BX	98.40
Acid Black Wax	135.50
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Procinil Red GS (I.C.I., UK)	530.00
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Procinil Orange G (I.C.I., UK)	250.00
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Yellow CFG Hly. Conc.	312.00
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Fast Yellow CHRS	95.45
Viscose Orange A	166.15
Fast Orange GR	133.75
Red	96.90
Dark Tan	78.25
Red IIR	72.55
Red 4B	169.10
Bordeaux BW	132.30
Fast Scarlet 4BS	166.55
Red 12B	170.55
Bordeux Hly Conc.	194.00
Cotton Red N	117.05
Brill. Fast Helio B	278.00
Brill. Fast Helio 2B	297.00
Brill. Fast Helio 2RS	136.20
Brill. Fast Helio BS	116.10
Brill. Violet Extra	126.40
Blue 2B	86.60
Blue G	170.50
Sky Blue FB	188.25
Copper Blue GR	147.00
Fast Greenish Blue GL	114.60
Developed Black BT	116.10
Blue NB-2B	300.20
Blue NB-2BC	185.30
Developed Black NB-BH5	185.30
Green B	111.65
Green NB-B	188.25
Green 2B-N	188.25
Brown MR	154.40
Brown CN	107.25
Golden Brown G	140.35
Catechin G	120.50
Omega Tan	126.40
Catechin GS	102.80
Black E Hly Conc.	142.60
Black E Extra Hly Conc.	142.60
Black NB-ER Hly. Conc.	310.50

DISPERSOL COLOURS	Per Kg
Yellow 6G Powder	143.80
Red B 3B Powder	247.80
Red B 2B Powder	323.20
Red CB Powder	439.15
Red D2B Powder	477.40
Violet C 4R	521.90
Blue BG Powder	235.45
Blue BN Powder	103.75
Blue D 2R Powder	476.25
Navy BT Powder	243.90
Blue B 2G Powder	210.20
Black BT Powder	182.60
Blue BR Powder	390.20
Yellow 7GL	338.60
Yellow 5RX	218.80
Yellow 3G	367.25
Yellow	140.00
Yellow AL	135.30
Yellow Brown REL	247.50
Yellow FFL	463.60
Gold Yellow GG	259.70
Pink REL	247.00
Red REL	468.65
Red 2B	327.40
Red FB	324.20
Red Violet FBL	469.85
Orange 3R	196.65
Violet 3R	280.60
Violet 6R	485.75
Violet RL	275.45
Scarlet RR	214.85
Rubine 3B	223.05
Rubine CB	364.90
Blue GL	318.95
Blue BGF	636.55
Navy Blue RE	270.40
Brown 3REL	200.40
Black GEL	324.20
Dark Brown 3B	317.40

BASE COLOURS	Per Kg.
Fast Yellow GC	80.20
Fast Orange GC	135.45
Fast Scarlet R	166.80
Fast Scarlet RC	126.65
Fast Scarlet RCR	99.05
Fast Scarlet G	121.65
Fast Scarlet GN	91.50
Fast Scarlet GG	72.70
Fast Scarlet GGS	72.70
Fast Red B	203.20
Fast Red RC	119.15
Fast Red R Flakes	149.25
Fast Red TR	166.80
Fast Red TR Oil	183.15
Fast Red RL	237.10
Fast Red KB Oil	201.95
Fast Bordeaux GP	201.95
Fast Garnet GBC	94.05
Fast Violet B	505.60
Fast Blue BB	521.45

NAPHTHOL COLOURS	Per Kg
ASG	217.00
AS	143.00
ASSW	279.75
ABBS	188.15
ASBO	195.65
ASD	175.60
ASOL	179.35
ASTR	279.75
ASPH	279.75
ASE	196.05
ASEI	184.40
ASLB	1632.60
ASBT	1817.00
ASWG	143.00
ASSG	397.70
ASSR	480.50

PROCION COLOURS	Per Kg
Golden Yellow HR	181.80
Brill. Yellow H 4G	117.55
Supra Yellow H-8GP	168.55
Brill. Yellow HE6G	166.95
Yellow H-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	243.95
Yellow M GR	326.05
Brill. Yellow M 4G	177.10
Brill. Yellow M 8G	332.30
Yellow M 3R	217.60
Brill. Orange H 2R	241.85
Brill. Orange M 2R	313.15
Brill. Red H 7B	157.95
Brill. Red H 8B	169.45
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.30
Brill. Red H-F3B	243.45
Brill. Magenta HB	167.00
Brill. Red M 5B	98.90
Brill. Red M 8B	173.70
Brill. Pink MB	137.10
Brill. Magenta MB	121.55
Brill. Purple H-3R	180.20
Brill. Purple H-7R	175.40
Navy Blue H 3R	298.50
Brill. Blue H-GR	366.55
Brill. Blue H 5G	173.10
Blue H 5R	283.85
Brill. Blue H 7G	178.70
Brill. Blue H 7RX	358.15
Turquoise HA	234.45
Supra Blue H-3RP	335.70
Supra Turquoise H 2GP	181.50
Blue H-ERD	305.80
Navy Blue H ER	258.60
Blue H 5RX	269.30
Navy Blue M 3R	310.95
Brill. Blue MR	331.70
Brill. Blue M RX	214.20
Brill. Blue M-G	382.30
Blue M 4GD	344.60
Navy Blue M RB	318.75
Turquoise M-G	197.85
Brill. Blue M GX	302.50
Blue 3R Acra Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg)	285.00
Green H 4BD	269.80
Green H-E4BI	169.80
Red Brown H 1F	143.25
Orange Brown H 2B	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS	Per Kg
Navy Blue	99.85
Green G	198.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI)	Per Kg
Yellow 5G Powder Fine	673.15
Yellow 5G Supra Disperse	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr Fine	624.35
Gold Orange 3G Supra Disp.	570.30
Brill. Orange 6R Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disc.	713.20
Brill. Purple 4R Conc Powder	470.75
Brill. Purple 3R Acra Powder	696.85
Brill. Purple 2R Hly Conc.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Conc.	625.95
Blue R Powder Fine	542.15
Blue BC Conc Pdr. Fine	522.50
Blue BC Acra Conc Pdr. Fine	762.70
Blue R Conc Pdr. Fine	577.65
Blue RR Supra Powder	629.35
Blue Conc Powder	645.80
Brill. Blue 2R Hly Conc	378.55
Brill Blue 2R Supra Disp	115.65
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Pdr.	823.95
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Pdr. Fine	419.65
Jade Green 2G Ptg. Paste	125.40
Olive Green B Pdr. Fine	355.90
Olive Green B Supra Disp.	358.20
Jade Green 2G Supra Disp.	456.00
Jade Green XBN Supra Disp. (N)	327.30
Olive D Pdr. Fine	444.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp.	536.05
Olive R Pdr. Fine	422.95
Olive R Supra Disp.	363.90
Olive D Supra Disp.	361.70
Olive D Ptg. Paste	193.00
Olive Green B Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc	640.00
Olive Green B Acra Conc	542.75
Brown R Pdr. Fine	835.00
Brown G Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
Dark Brown 3R Pdr. Fine	685.00
Brown G Supra Disp.	445.90
Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.55
Brown G Acra Conc	733.95
Brown R Acra Conc	765.00
Grey M Powder Fine	763.80
Grey M Supra Disp.	585.45
Blue BC Acra Conc Pdr. Fine	782.70
Direct Black AC Pdr. Fine	474.70
Direct Black AC Supra Disp	330.35
Direct Black CH Supra Disp	393.2
Direct ACD Ptg. Paste	217.1

Delhi Market

DELHI : OCT. 9 (NNS) — Menthol prices slumped by Rs. 15 per kg. in the local chemicals market during past week, thanks to increased arrivals from U.P., says NNS. Ammonia bicarb, titanium dioxide and camphor thal also reacted downward while hydrogen peroxide firmed up by Rs. 2 per kg. caused by hike in prices by manufacturers. Paraffin wax and mercury also showed an upward trend.

Menthol flake, medium and bold dropped by Rs. 15 each at Rs. 145, Rs. 160 and Rs. 170 per kg. respectively in the face of increased offerings of about 6 tonnes of the commodity from Rampur. Moradabad, and Chandosi mandis of U.P. Mentha oil drifted lower by Rs. 7 at Rs. 113 per kg. for want of support.

Ammonia bicarb declined further by Rs. 5 at Rs. 140 per 25 kg. in the absence of demand from Bihar, Orissa and Karnataka in face of improvement in arrivals. Within three weeks it's prices slipped sharply by Rs. 22.

Titanium dioxide Anatase eased slightly by 50 paise at Rs. 52.50 on expectation of increased production in Kerala due to improvement in power supply. Camphor thal softened by Rs. 2 on increased offerings.

Mercury went up by Rs. 100 on tight stock and fall in arrivals. Soda caustic flake sold by Rs. 3. Paraffin wax hardened by Rs. 25 at Rs. 625 per 50 kg. and refined wax marked up by Rs. 10 at Rs. 710 per 62-1/2 kg. in the wake of sustained demand shown by candle manufacturers induced by tight supply of imported and indigenous goods. Hydrogen peroxide firmed up by Rs. 2 at Rs. 30 following hike in its prices by manufacturers.

Sodium hydro sulphite edged up by 50 paise at Rs. 34.50 on reports of heavy purchasing shown by the gur khandsari makers of U.P. and Haryana. Rangolite Germany was not available in the market in sufficient quantity, while Rangolite Chatkolight and Suffolight ruled quiet at Rs. 38.

Sodium sulphate quoted higher at Rs. 3000/3200. Naphthol AS and ASG advanced by Rs. 10/20 caused by hike in its prices by manufacturers. ASBS and ASTR also rose by Rs. 7/8 in support. Among direct dyes Diazo Black, B.T. and Sky blue FB colour increased by Rs. 5/14.

DELHI MARKET RATES AS ON OCTOBER 9, 1987

Ammonia Bicarb (per 25 kg)	140.00
Mercury (per flask)	6,700.00
Soda ash (per bag)	270-285.00
Ammonium Chloride (per 50 kg.)	110-180.00
Caustic Soda solid (per 50 kg.)	360.00
Caustic soda flakes (per 50 kg.)	343.00
Citric acid (per 50 kg.)	2050-2150.00
Stable Bleaching Powder Shriram (per 25 kg.)	89.00
Stable Bleaching Powder KCI (per 25 kg.)	83.00
Stable Bleaching Powder MODI (per 25 kg.)	87.00
Sod. Bicarbonate (per 50 kg.)	250.00
Sod. Hydro Sulphite (per kg.)	31-34.50
Rangolite (per kg.)	38.00
Boric acid Technical (per 50 kg.)	980.00
Paraffin wax (per 50 kg.)	625.00
Tartaric acid (per 50 kg.)	6,200.00
Borax Granular (per 50 kg.)	520.00
Borax Crystal (per 50 kg.)	550.00
Sodium Nitrite (per 50 kg.)	650.00
Sodium Nitrate (per 50 kg.)	410.00
Camphor Thal (per kg.)	100.00
Camphor Powder (per kg.)	90.00
Menthol Bold (per kg.)	170.00
Menthol flake (per kg.)	145.00
Menthol medium (per kg.)	160.00
Glycerine (per kg.)	45-55.00
Sodium Silicate (per quintal)	300.00
Hexamine (per kg.)	26.00
Acetic Acid Glacial (per kg.)	14.50-18.00
Copper Sulphate (per quintal)	1,500-1,800.00
Formic acid (per kg.)	32-33.00
Formaldehyde (per kg.)	6.00
Hydrogen Peroxide (per kg.)	30.00
Calcium Carbonate (per Tonne)	2,500-4,000.00
Acid Slurry Soft (per kg.)	25.00
Acid Slurry Hard (per kg.)	32.00
Phosphoric Acid (per 50 kg.)	810.00
Pot. Nitrate (per quintal)	850-1,200.00
Pot. Permangnate (per 50 kg.)	2,400.00
Sod. Bichromate (per 50 kg.)	1,025-1,125.00
Tri-sod. Phosphate (per 50 kg.)	310-330.00
Titanium Dioxide Anatase (per kg.)	52.50
Titanium RC-822 (per kg.)	57.50
Zinc Oxide (Per Metric Tonne)	28,500-32,500.00
Phenol Carbolic Acid (per kg.)	28.00
Carbon Tetrachloride (per kg.)	16.50
Chloroform (per kg.)	26.00
Sodium Sulphate (per m. tonne)	3,000-3,200.00
Naphthalene Balls (per 50 kg.)	1,025-1,050.00

DYES & COLOUR	Per Kg.
Naphthol AS	150.00
Naphthol ASG	235.00
Naphthol ASBS	200.00
Naphthol ASTR	302.00
Naphthol ASOL	191.00
Naphthol ASBO	208.00

DIRECT DYES	Per Kg.
Black E. Conc.	92-150.00
Diazo Black B.T.	125.00
Green B.	115.00
Blue 2-B	86.00
Sky Blue FB	200.00
Basic Auramine 'O' Conc.	55-100.00
Basic Rhodamine B. 500%	220-300.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

Madras Market

Prices in the Madras chemical market remained very dull due to tight money market during the week under review. Prices remained sticky around the previous rates. No major changes in prices were noted. Due to water scarcity in Tamil Nadu Industries were very much affected. The volume of transaction remained meagre.

In the Madras stock market among chemical shares E. I. D. Parry on the announcement of bonus issue went up to Rs. 31 before it was closing at Rs. 29; Indo Gulf Fertilisers remained steady activities at Rs. 8. T.A.C. noted dull transaction at Rs. 12.50; Tamil Nadu Petro fluctuated and maintained interest at Rs. 18.85; Oswal Agro group noted active trading at better levels.

MADRAS MARKET RATES AS ON OCTOBER 13, 1987

Aluminium DCL (per tonne)	1,700.00
Acetic Acid Glacial (per kg.)	13.00
Ammonium (per kg)	17.00
Ammonium Bicarbonate (per 25 kg.)	135.00
Ammonium Chloride SPIC (per tonne)	1,900.00
Ammonium Chloride Ind. (per tonne)	1,980.00
Bleaching Powder DCM (per 25 kg.)	100.00
Chromic Acid Flakes (per kg.)	24.00
Borax Granular BML (per 50 kg.)	570.00
Sodium Acetate (per 50 kg.)	200.00
Carbolic Acid (per kg.)	17.00
Calcium Chloride DCM (per 50 kg.)	200.00
Caustic Soda Solid (per 50 kg.)	355.00
Caustic Soda Flakes Andhra (per 50 kg.)	355.00
Caustic Soda Flakes Mettur (per 50 kg.)	360.00
Cobalt Oxide (per kg.)	360.00
Citric Acid Deshi (per 50 kg.)	3,400.00
Copper Sulphate (Ram) ISI (per 50 kg.)	825.00
Cresylic Acid (per kg.)	42.00
Formic Acid Indian (per kg.)	36.00
Formaldehyde (per kg.)	11.00
Hydrosulphite of Soda Imp. (per tonne)	36,000.00
Hydrosulphite of Soda Ind. (per tonne)	35,000.00
Hydrogen Peroxide BASF (per tonne)	28,000.00
Magnesium Chloride Pure (per kg.)	21.00
Oxalic Acid (per 50 kg.)	900.00
Manganese Sulphate Tech. (per 50 kg.)	240.00
Manganese Sulphate Fert. (per 50 kg)	265.00
Mercury (per 3.45 kg.)	9,000.00
Sodium Nitrate	375.00
Sodium Oxide (per kg.)	1,050.00
Phosphoric Acid (per kg.)	12.00
Stearic Acid (per kg.)	18.00
Soda Ash Tata (per 75 kg.)	275.00
Soda Ash Birla (per 75 kg.)	305.00
Sodium Bichromate (per kg.)	280.00
Sodium Bicarbonate Birla (per 50 kg.)	175.00
Sodium Bicarbonate Tata (per 50 kg.)	160.00
Sodium Cyanide Brigs (per tonne)	90,000.00
Sodium Cyanide GDR (per kg.)	50.00
Sodium Bisulphite Aswin (per 50 kg.)	185.00
Sodium Silicate (per 50 kg)	130.00
Sodium Sulphate Powder (per tonne)	3,000.00
Sodium Sulphide (S) (per tonne)	5,200.00
Titanium Dioxide (per kg.)	54.00
Trisodium Phosphate (per 50 kg.)	300.00
Urea Tech (per kg.)	185.00
Zinc Chloride Solid (per kg.)	9.00
Zinc Sulphate (Ram) (per tonne)	4,500.00
Acetone (per kg.)	29.00
Benzene (per kg.)	25.00
Carbon Tetrachloride (per 100 kg.)	1,500.00
Isopropyl Alcohol (per kg.)	40.00
Cellosolve (per kg.)	45.00
Chloroform (per kg.)	25.00
Diethyl Alcohol (per kg.)	27.00
Dibutyl Phthalate (per kg.)	31.00
Toluene (per kg.)	18.00
Sorbitol (per kg.)	28.00
Dioctyl Phthalate (per kg.)	31.00
Methyl Ethyl Ketone (per kg.)	45.00
Nitrobenzene (per kg.)	11.00
Trichloroethylene (per kg.)	24.00
Triethanolamine (per kg.)	40.00
Turpentine Oil (per kg.)	7.00
Caustic Potash Flakes (per kg.)	1,000.00
Isobutanol (per kg.)	18.00
Propylene Glycol (per kg.)	26.00
Paraffin Wax (per bag)	700.00
Alkyl Benzene (per kg.)	35.00
Pentaerythritol (per kg.)	58.00
Glycerine HCL (per kg.)	48.00
Hyflosupercell (per kg.)	19.00

MATERIALS IMPORTED

BOMBAY
(From 1.10.87 To 9.10.87)
(Cost of Imported Item is
CIF Value)

AEROSOLS : From USA : Reliance Industries, NA kgs., Rs. 1,889.

AMINO METHYL : From Korea : Cephena Labs. Ltd., Sonepat, 100 kgs., Rs. 65,462.

AROMATIC CHEMICAL : From France : The Tata Oil Mills Co. Ltd., 2,600 kgs., Rs. 47,66,695; From Japan : Tata Oil Mills Co. Ltd., 1,440 kgs., Rs. 69,722.

CAPROLACTAM : From Belgium : Garware Nylons Ltd., 1,77,500 kgs., Rs. 33,18,528.

CELLULOSE ACETATE : From USA : Indian Commercial Co., 11 kgs., Rs. 600.

DINITRO BROMOANILINE : From Japan : Sandoz (I) Ltd., 2,550 kgs., Rs. 1,11,943.

EPICHLOROHYDRIN : From Japan : Sandoz (I) Ltd., 6,000 kgs., Rs. 1,14,654.

ETHYLENE ACRYLIC ACID : From USA : Futura Packaging (I) Ltd., 3,000 kgs., Rs. 85,216.

HIGH DENSITY POLYETHYLENE : From USA : Fortune Fibres P. Ltd., 17,000 kgs., Rs. 1,52,406; From Saudi Arabia : National Inds., Jodhpur, 24,750 kgs., Rs. 1,96,210; From Portugal: United Bros., 16,675 kgs., Rs. 1,56,092.

HYDROXY ETHYL CELLULOSE : From Holland : Asian Paints (I) Ltd., 1,000 kgs., Rs. 55,312.

LABORATORY CHEMICALS : From West Germany : Chemical Centre, Rs. 2,99,888.

LINEAR ALKYL BENZENE : From Egypt : Silvassa Syndet P. Ltd., 50,000 kgs., Rs. 4,82,247; Varni Chemical P. Ltd., Madurai, 15,000 kgs., Rs. 4,82,271.

METHACRYLIC ACID : From Japan : Bakelite Hylam Ltd., 3,000 kgs., Rs. 78,536.

METHYL AMINO PIPERAZINE : From Bulgaria: Vikram Pharma Ltd., 180 kgs., Rs. 1,34,796.

METHYL HYDROGEN : From UK : Reliance Silicon P. Ltd., 1,960 kgs., Rs. 1,13,651.

METHYL ISOBUTYLENE KETONE : From Japan : Polyolefin (I) Ltd., 50,160 kgs., Rs. 4,85,733.

MORPHOLINE : From UK : Bayer (I) Ltd., 16,380 kgs., Rs. 3,88,866.

NAPHTHENIC ACID : From West Germany : Aryavart Chemical P. Ltd., 5,070 kgs., Rs. 78,967.

ORTHO CHLORO TOLUENE: From West Germany : Bayer (I) Ltd., 1,000 kgs., Rs. 31,384.

PARAXYLENE : From Italy : The Bombay Dyeg. Mfg. Co. Ltd., 3,824 kgs., Rs. 2,03,11,463.

POLYETHYLENE : From Japan : Chemical Corpn. of (I) Ltd., 4,000 kgs., Rs. 74,887; From USA : Synor Chemicals, 14,000 kgs., Rs. 2,60,104.

POLYVINYL ACETATE : From Korea : Pidilite Inds. P. Ltd., 15,200 kgs., Rs. 1,13,823; 15,200 kgs., Rs. 1,13,828;

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POTASSIUM CARBONATE : From Japan : Polyolefins (I) Ltd., 35,000 kgs , Rs. 2,25,952.

POTASSIUM HYDROXIDE FLAKES : From Japan : Indian Dyestuff Inds. Ltd., 4,000 kgs., Rs. 31,340.

POTASSIUM PENICILLIN : From Australia : Alembic Chemical Works Ltd., NA kgs., Rs. 19,77,387.

SILICON GRADE: From West Germany : The Indian Cable Co. Ltd., Calcutta, 2,000 kgs., Rs. 1,91,150.

SILICON OIL : From USA : Sameto Resin & Chemical Inds., 200 kgs., Rs. 21,285.

TITANIUM DIOXIDE RUTILE : From France : Bombay Paints & Allied Products, 20,000 kgs., Rs. 5,03,551.

TOLUENE DIISOCYANATE : From West Germany : U. Foam P. Ltd., Hyderabad, 5,000 kgs., Rs. 1,32,343.

TRICHLORO ETHYL PHOSPHATE : From Japan : Bakelite Hylam Ltd., 1,500 kgs., Rs. 60,039.

TRIDECYL ALCOHOL : From France : Sandoz (I) Ltd., 6,970 kgs., Rs. 1,19,528.

TUNG OIL : From Argentina : Formica (India), 5,000 kgs., Rs. 75,599.

New Developments from Japan

NEW PRODUCT IMPARTING HYDROPHILIC PROPERTY

Sumitomo Chemical Co. has developed a unique master batch combining water absorbent resin and polypropylene resin and capable of imparting a hydrophilic property to a molded product, and has begun shipping samples.

Compared with conventional products, the new product requires only 50 percent of the water absorbent resin and does not reduc- the properties of polypropylene. It is used for elevating an antistatic property and the printing effect of water-based ink.

UNIQUE SEMICONDUCTOR ETCHING AGENT BARED

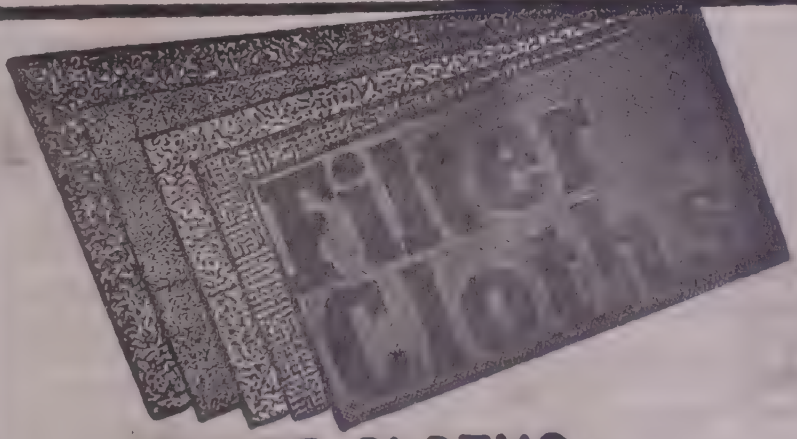
Hashimoto Chemical Industries Co. has developed, together with Professor H. Ohmi of Tohoku University, a buffered hydrofluoric acid to be used effectively for wet-etching of semi-conductors.

Conventional wet-etching processes for VLSIs using a buffered hydrofluoric acid have a problem with regard to production of very fine circuit lines and application. The new chemical mixed with a hydrocarbon-based surfactant effectively eats away the surface of a semiconductor as well as easily covering its surface, greatly facilitating manufacture of VLSIs it is claimed.

GLUCOSE COMBINED WITH DRUGS WITHIN PLANT CELLS

Mitsui Toatsu Chemicals, Inc. has combined glucose with two types of drugs within plant cells in a bid to improve their efficacy.

The two drugs are allopurinol — an antigout drug — and chlorpleresin carbamate — a drug designed to relax skeletal muscles. They are produced by Mitsui Pharmaceuticals, Inc. and Mitsui Toatsu has combined gulcose with them in an effort to consolidate a business tie-up with Mitsui Pharmaceuticals.



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Allopurinol and chlorplenesin carbamate were efficiently combined with glucose within the cells of a Cape Jasmine and perilla Frotescens (beef steak plant) respectively; the cells were artificially cultured and took in glucose contained in media.

The efficacy and safety of the thereby obtained glucosides are being examined by Mitsui Pharmaceuticals.

There is a possibility that combining glucose with pharmaceuticals will result in production of new, effective drugs.

GENE MODIFICATION APPLIED SUCCESSFULLY TO CABBAGE

Plantech Research Institute, a plant research organization operated by Mitsubishi Corp. and Mitsubishi Chemical Industries Ltd., has succeeded in applying gene-recombinant technology to the cabbage and obtained a gene-modified cabbage for the first time in the world.

It recombined a kanamycin-resistant gene into a binary vector it developed by manipulating a cauliflower mosaic virus and a wild strain of agrobacterium and the binary vector has been implanted into a cabbage. The crown galls produced from the cabbage with the binary vector have produced adventitious buds, from which a qualified one with a kanamycin-resistant property has been selected. The bud can grow into a cabbage plant with the property in question.

It is rare to successfully apply a gene-recombination technique to plants of the genus to which the cabbage belongs, although cell culture and cell fusion have easily been applied to them.

JOINT SUPERCONDUCTIVE MATERIAL RESEARCH KICKED OFF

Nihon Cement Co. has inaugurated a 3-year joint research project for high-temperature superconductive material in collaboration with The Technological University of Nagaoka.

They are aiming at developing high-temperature superconductive ceramics and thin films, analyzing the structure of high-temperature superconductive material using an electron microscope, manufacturing sensors and electronic optical devices from such superconductive material, and applying these devices to a wide-band communications system and an ultra-high-speed computer.

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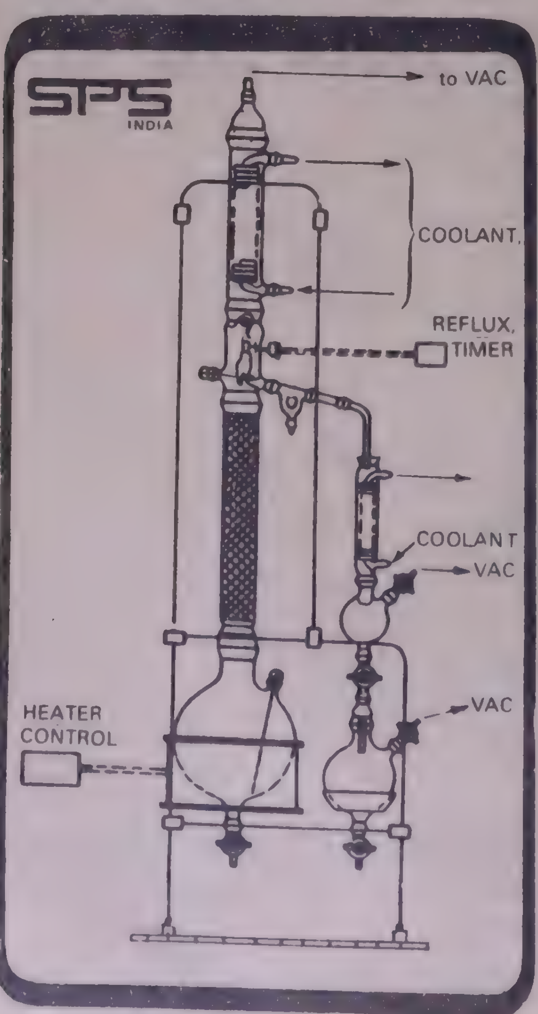

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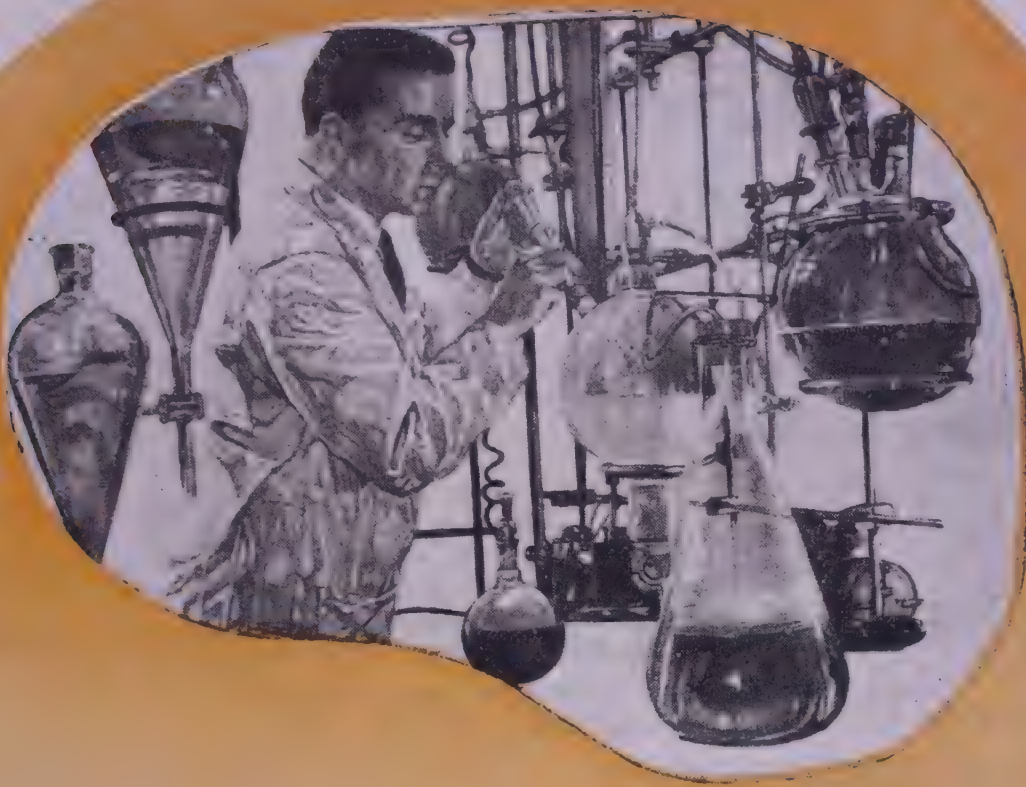

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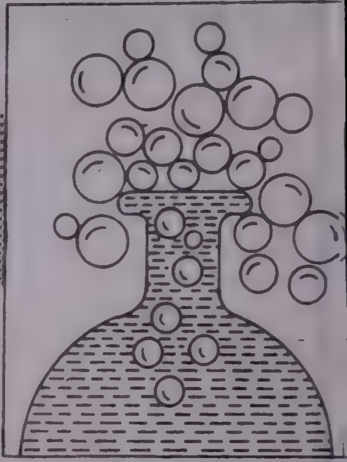

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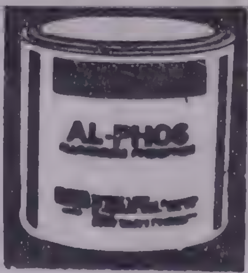

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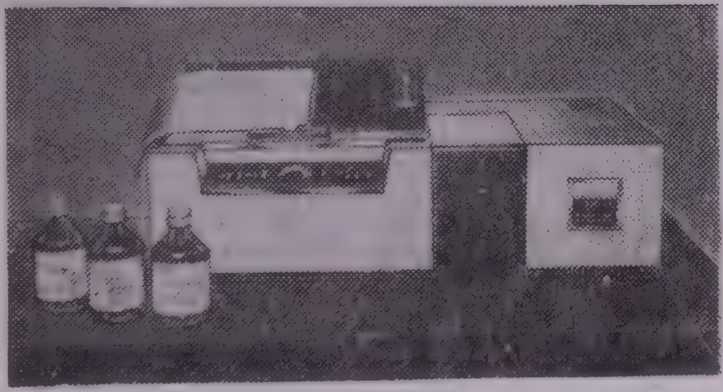

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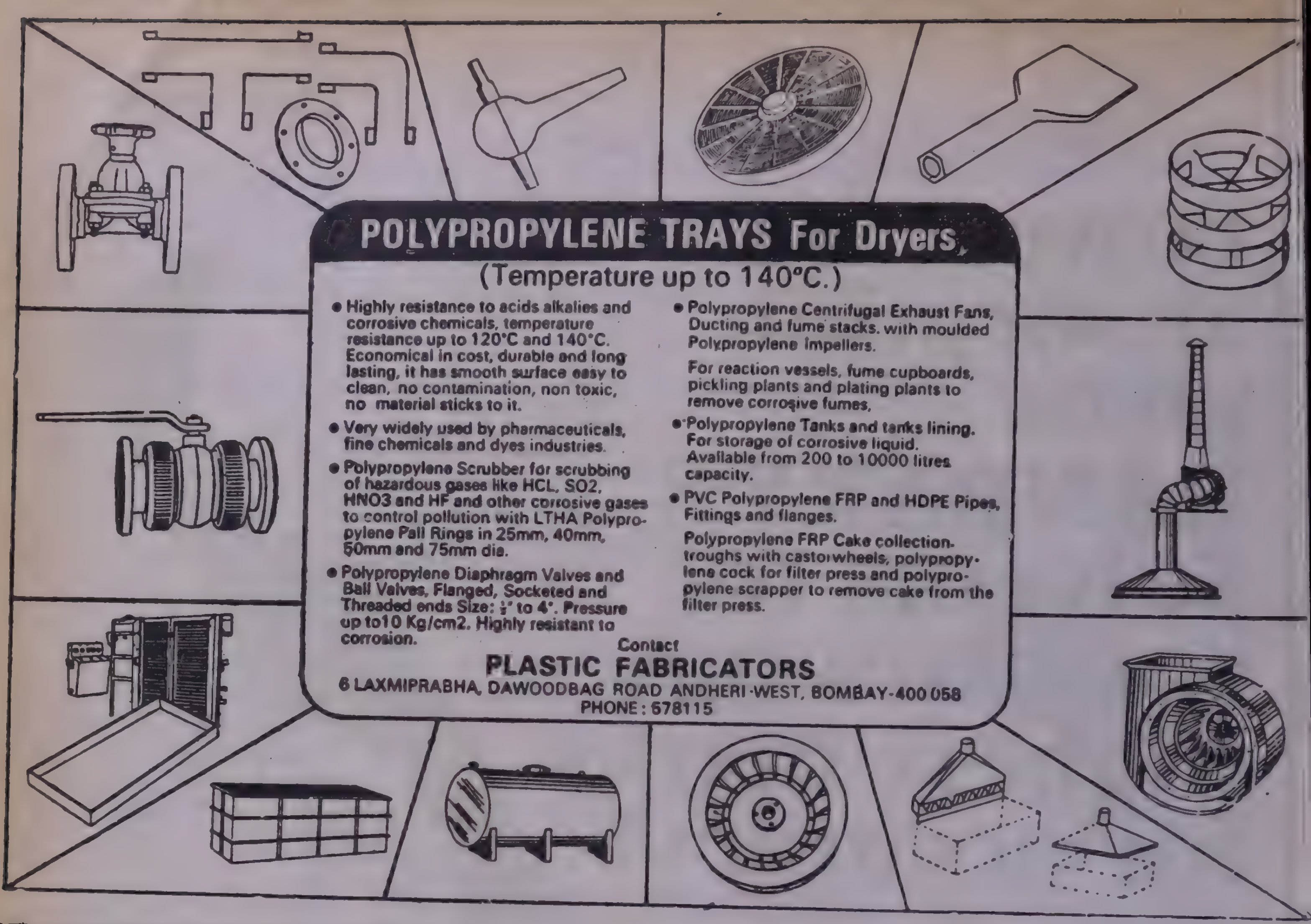

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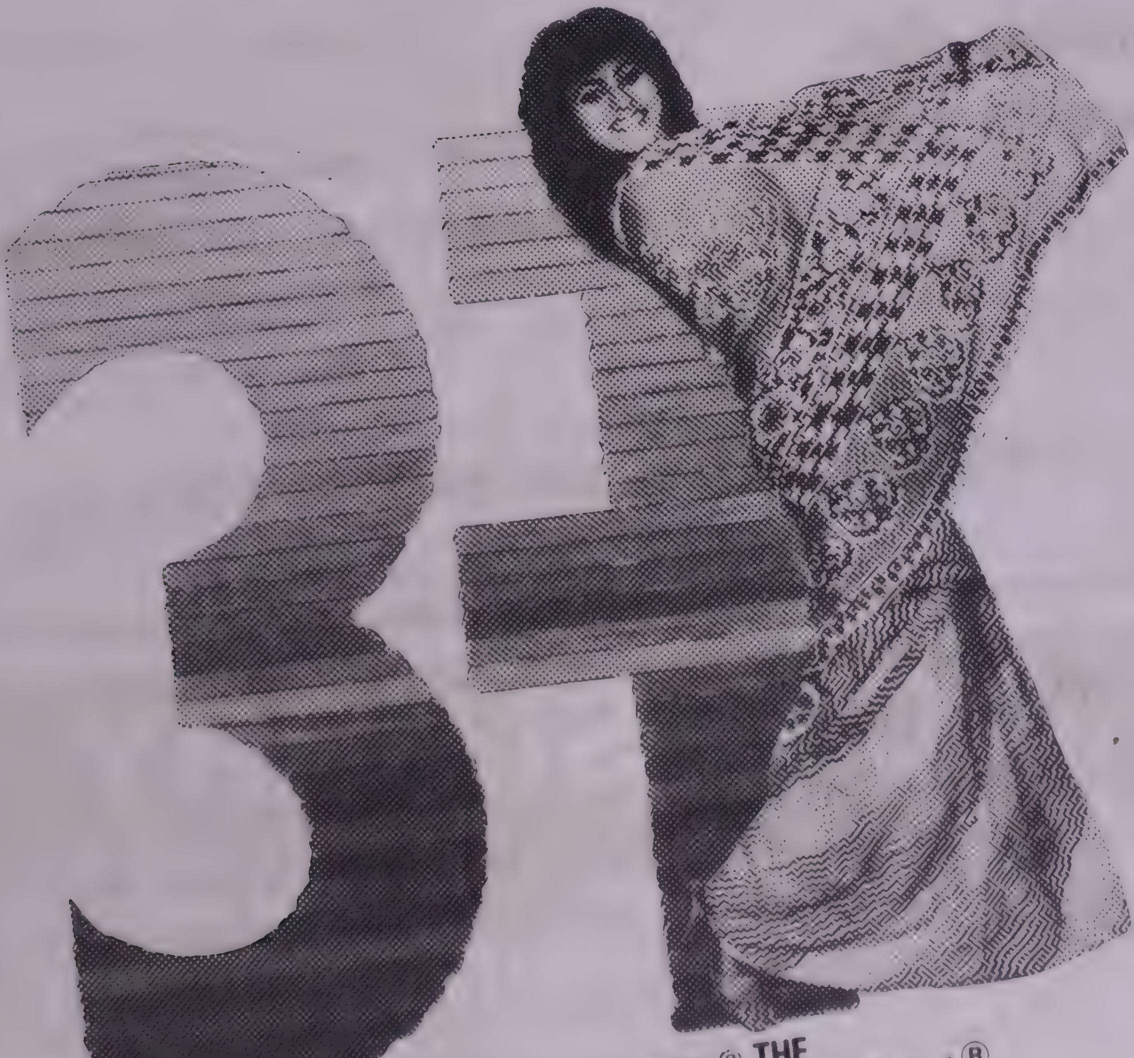

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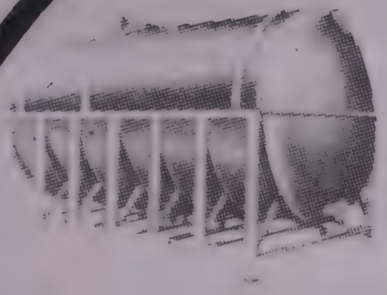

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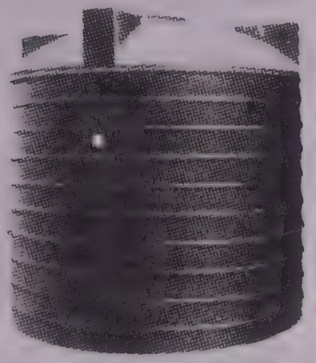

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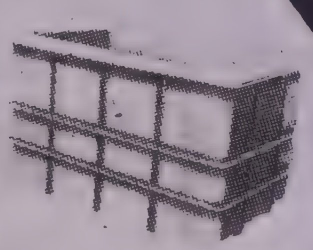

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CHEMICAL
WEEKLY

VOL. XXXIII OCTOBER 27, 1987 NO. 7

Chemical Exports

The year 1986 witnessed a record increase over the previous eight years in international trade in terms f value with regard to exports. The share of the indu- trially developed states continues to grow at a steady ate while the share of developing countries in World xports and imports continue to decline. Exports of indu- trialised countries grew by 16.3% and imports by 2.4%. In contrast, exports of developing countries fell y 5.9% while imports increased by a modest 1.7%. hese imbalances led to a decline in the share of the eveloping countries in the world trade from 28.7% in 985 to 24.6 in 1986. As regards imports their share fell om 27% in 1985 to 23.2% in 1986.

The value of international trade in 1986 in terms of JS dollars increased by 10% over the previous year. Vorld exports increased by 10.1% or by US $183 bil- on over 1985 and world imports by 9.9% equal to US 187 billion.

During 1986-87, India's exports were placed at Rs. 2,550 crores as against Rs. 11,012 crores in the pre- ious year recording an increase of 17% as against an verage annual growth target of 7% envisaged for the th Plan period. The total imports in 1986-87 increased o Rs. 20,062 crores from Rs. 19,765 crores in the pre- ious year, showing a modest reduction in trade deficit.

The exports effected through the Basic Chemicals Pharmaceuticals and Cosmetics Export Promotion Council rose by Rs. 83 crores to Rs. 561 crores in 1986 as against the ambitious target of Rs. 1,000 crores by he end of the 7th Plan. It is disconcerting to note that he share of chemical goods exports in India's total exports accounts only for 4.2%.

While the seventies witnessed a creditable growth rate n chemical goods exports from Rs. 130 crores in 1974-75 to Rs. 450 crores in 1984-85 the pace has noticeably slowed down during the eighties. A review f the chemical exports reveals that drugs and pharmaceuticals have accounted for about 33% (Rs.223 crores); dyestuffs and intermediates 14% (Rs. 99 crores) basic inorganic and organic chemicals including agrochemicals around 10% (Rs. 66 crores), cosmetics and tablets 12% (Rs. 84 crores), agarbatties, essential oils, medicinal herbs and miscellaneous items 3% (Rs. 17 crores). Export of naphtha accounted for 12% (Rs. 83 crores).

The distribution of India's exports of chemical goods shows that USSR accounted for the largest share of 33% (Rs. 185 crores). The major item of exports were medicaments, medicinal castor oils, drug intermediates, cosmetics, synthetic detergents, synthetic coal tar dyes, H acid, chicago acid, ion exchange resin etc.

The USA accounted for 14.1% (Rs. 79 crores) of the exports, of which the items included opium (15.6 crores), Psyllium husk and seeds (Rs. 16 crores) besides patent and proprietory medicines, drug intermediates, rare earth chlorides, sandalwood, lemon grass oil etc.

The exports of drugs and pharmaceuticals increased from Rs. 194 crores in 1985-86 to Rs. 223 crores in 1986-87 registering an increase of 14.7%. The major items were finished formulations, basic drugs, medicinal castor oils and quinine salts. The major items of exports among the group basic drugs continued to be sulphamethaxazole, tinidazole, ibuprofen, metronidazole, erythromycin, beta ionone, potassium iodide, ethambutol etc.

However the export increase registered in basic drugs has been offset by the set back suffered from the decline of finished formulation and medicinal castor oil. Exports of veterinary drugs have shown substantial increase to Rs. 1.81 crores in 1986-87, major buyers being USSR, UK and Sri Lanka. Major buyers of antibiotics were Singapore, Malaysia, Sri Lanka, Mauritius, Oman, Nigeria and Thailand. Major buyers of quinine sulphate were Belgium and GFR.

Dyes and dyes intermediate sector reached a record figure of Rs. 99 crores. Major items which have contributed to the excellent performance of this sector are organic pigments, reactive dyes, H. acid, meta anilic acid, azoic acid, gamma acid, vat dyes. On the contrary acid dyes, direct dyes, chicago acid, anthraquinone are among the items which suffered a decline in exports during 1986-87.

The present spirit in export demand for dyes and dye intermediates offers an unprecedented opportunities for the industry to achieve export level hitherto taken by advanced countries of West Europe and Japan. The total dyes production and exports of India represent about 25% of the world's total market. Therefore there is an urgent need to evolve a strategy to achieve a major breakthrough in the shortest time otherwise the present tempo of increase in exports would prove to be short-lived.

Exports of basic inorganic and organic chemicals which were hardly around Rs. 1.2 crores in 1963-64 has risen to Rs. 24 crores in 1979-80 and Rs. 62 crores in 1986-87. The exports of inorganic and organic chemical group have showed substantial growth but agrochemical group has suffered a set back mostly due to reduced offtake by USSR.

Rare earth chloride and fluoride have shown marginal increases, Japan, Canada, USA, Thailand and Korea being the major importers. Bleaching powder has shown good recovery. The demand for red phosphorous from USA, Singapore, Egypt continued to be good and rubber chemicals, a new entrant, continues its steady progress.

Perfumes, hair shampoos, scouring powder, medicated soaps, Henna leaves and powder have maintained their traditional markets. However there is a fall in the value of these exports, mostly due to the lesser offtake from USSR. Agarbatties form a cottage industry, mostly in the Southern region. The entire exports from India have been effected by small scale units. Out of the total exports of Rs. 8.4 crores, 80% come from South India.

The total exports of essential oils have increased from Rs. 15.7 crores to 23.7 crores in 1986-87 registering an increase of 15%. The increase was due to an increase in Unit value volume of trade and diversification of markets. Ginger oil, sandalwood oil, jasmine, tuberose concentrate, lemongrass oil, palmarose oil are the main products under the group of essential oils. This sector recorded an increase in export earnings from 15.7 crores to 23.7 crores in 1986-87 mainly due to spurt in demand and diversification of market.

Exports of Sandalwood oil rose sharply from Rs.
to Rs. 14.50 crores. This product alone contribut
more than 61% of the total exports of essential oil
ering to markets in Japan, USSR and USA. Lemon
oil was another product which trebled its export
from Rs. 0.91 crore to Rs. 2.91 crores accountin
more than 12% of the total exports of essential oil.
buyers continued to be France, USSR and Aust
Unfortunately the other products, ginger oil, jasmine
errose concentrate acid, cardamom oil register
decline in export.

Exports of medicinal plants also showed a decl
trend to Rs. 58 crores from the previous years figu
Rs. 66 crores. In this sector, exports of opium, psy
husk, senna leaves and pods contributed to 89% o
total. The major buyers continued to be USA, UK,
Germany, France, Netherland, USSR, Italy, Can
Japan, Spain and Mexico.

Though East and West Europe continue to acc
for more than 50% of India's exports, East Euro
share has declined to 34.1% from 41.3% in the p
ous year. The offtake of western Europe (23%) U
Canada and other states of the American conti
(15%), West Asia (4%) and South Africa (4%) h
remained almost unchanged. The share of the Afr
countries have come down from 4.1% to 3%. The sh
fall in exports to East Europe, and Africa is set of
an increase in exports to East Asia which rose from 9
to 16.7%.

As regards individual countries, the USSR contin
to be the biggest buyer of Indian chemical produ
accounting for 32.8% followed by USA (14.16%), W
Germany (5.8%), France (4.4%), UK (4.3%) and Ja
(3.8%).

The Export Promotion Council has fixed an ambiti
target for the new year. The Government of India h
indicated a target of Rs. 1,000 crores for 1989-90 aga
an actual export of Rs. 561.93 crores during 1986-
With the uncertainties governing the export price
market for naphtha, there might be a fall in the curr
export figure of Rs. 80 crores from this course. In
meanwhile there are optimists who visualise an ex
target of Rs. 5,000 crores by the turn of the century.
only hope lies in developing value added products
penetration of new markets; otherwise our targets m
remain illusory.

--T.P.S. RAJ

CHEMARENA

L. VENKITESWARAN

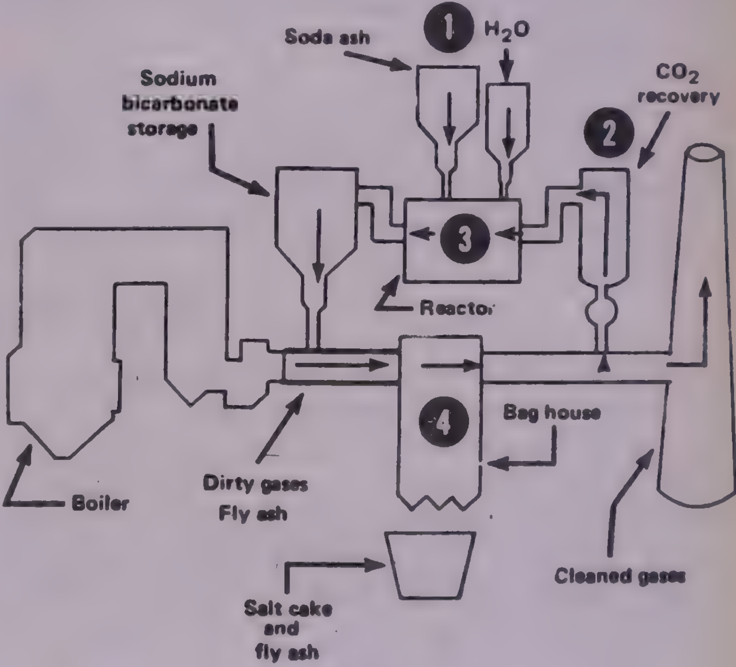
Fuel Gas Disulfurisation with Soda Ash

FGD or Flue Gas Desulfurisation is being increasingly posed by Governments for a better environment. O_2 from these gases is the main culprit in "acid rain". e presently available methods for FGD are based on et-scrubbing using lime as the main component result- in a waste gypsum. Now the use of sodium carbo- te in a dry injection method has been developed. tually sodium bicarbonate is the active chemical but s can be generated from the CO_2 of the flue gas by da ash. Church and Dwight of Princeton, N.J., U.S.A., e the developers of this dry sorbent process. The carbonate (generated in the operations is injected into e flue gas stream just ahead of a fabric filter bag house electrostatic precipitator. The bicarbonate reacts with O_2 and residual oxygen to form salt cake, water and rbon dioxide. The salt and fly ash are collected on the y filter and disposed off as landfill. Other sodium com- unds like trona, sesquicarbonate can be used but da ash gives the best results.

The C & D process including the generation of bicar- nate is shown in Figure alongside.

The energy and capital costs are lower for the dry sor- ent system. The process for on-site generation of carbonate is said to be a proprietory method for treat- g soda ash with carbon dioxide. FMC is another pro- oter of the sodium sorbent system and they are also ajor producer of soda ash. The process is meant for ue gases from low sulfur coals and not for the higher lfur coals where other methods with recovery of sulfur ay be more profitable. It is said that FGD uses about 300,000 tonnes of soda ash per year in the wet scrubber systems. The dry sorbent system will give a boost and the power companies that are coming under the tighter air pollution standards are the prospective customers. The first full scale plant is expected to be built soon and will use about 10,000 t/y of soda ash.

How Church & Dwight's on-site process works



1. Soda ash is more economical to ship....
2. ....but recovery of CO_2 permits....
3. ....conversion into sodium bicarbonate the most efficient agent for removing SO_2
4. Salt cake, the reaction product, and fly ash are collected.

Drug Testing is Big Business

The menace of drug addiction in USA has led to strict easures against illegal entry of such drugs into the ountry on the one hand and to take up measures to ee that employees of industry and Government are not ddicts or even occasional users. As a consequence of e better testing methods for such drugs or their meta- olic products in urine and blood, drug testing has omed into a big business in USA. The dollar volume of drug testing business is expected to reach 236 million by 1993. So far it is not compulsory but major US Corporations have adopted this as a policy and the screening of present employees and new recruits has been taken up. The US Administration has plans to test all its employees and has issued guidelines for such tests and for labs who do the testing. These technical guidelines and certification standards will be adopted after such amendments as may be called for in the light of comments on these guidelines. The U.S. Congress has authorised random testing of employees of the Department of Trade and this may be extended to other Departments and Agencies. The guidelines set limits on metabolites of Marijuana, Cocaine, Opiates, Amphetamines and Phencyclodine.

As the analysis is on urine, strict methods for collection of samples and the safe custody of the samples until and after certification are prescribed apart from the methods of testing first at the screeing and later at the confirmation stage. The confirmation test is based on gas chromatography or mass spectroscopy. The testing lab has to be certified on its facilities and quality of personnel and security arrangements and the qualification of the certifying scientist. The right to freedom is not applicable to drug-takers.

Major corporations have their own test facilities or more often entrust it to testing laboratories. The job losses due to drug abuse has become quite serious and staggering -- an estimated $100 million due to waste, inefficiency, accidents, absenteeism, legal costs, ical reimbursements etc. It is therefore, conside be in the Corporation's interest to take up testing employees as a compulsory measure. The esta ment cost for a testing laboratory of approved stan is quite high -- in hundred thousand dollars. Some Corporations organise the laboratory as a separat Drug abuse tests at Hoffman Roche's Testing L atory were about 15% of all testing in 1986 anc double in 1987. The urine specimens total up tc a thousand per day -- for all testing including for c Smith-Kline performs 24 million laboratory tests a of all kinds for a value of $373 million. Drug test estimated at 10 per cent of this. The screening gramme use enzyme immunoassay techniques cost of a test for 10 different drugs ranges from $ $35 and may go upto $100 for confirmation. Indeed testing is a big new business in U.S.A.

India should at least ensure more testing of re drugs in independent laboratories run by perso integrity and get over the problems of spurious c while keeping in view the testing for "drug" addic

Coal Gasification

Coal gasification for power plants is expected to take over in the next decade when the older power plants need replacement or are unable to cope up with the environment regulations. India has presently only two older generation plants for gasification linked to ammonia production which are in a bad shape. It is necessary to plan ahead for gasification and combined cycle power plants for the Nineties.

Although a U.S. Government project for coal-based gas was shut down in the wake of a fall in petroleum prices, there are plants in the private sector and more are in the offing. Shell Development has one for gasifying 250 to 400 tonnes a day of different grades of coal into a 300 Btu/Cft gas and 35,000 lbs per hour of process steam. This was built in collaboration with Lummus Crest and Electric Power Research Institute. It uses oxygen for burning dried crushed coal in an entrained bed slagging gasifier operating at high pressure. The Texaco gasification process is used in Eastman's Chemical Complex for acetic anhydride by carbonylation of methanol and also in a power plant at Cool-water, Calif. It is the base for two 1650 tones per day ammonia plants of Ube Industries in Japan and for three such new contracts including China.

There are two developments which could provide an impetus for coal gasification. Dow Chemical has taken over a reserve of a billion tonnes of brown coal in Louisiana which is equivalent to 75 years of fuel needed by them in two complexes in the area, Dow has develo its own gasification process with turbine/combined c cogeneration suitable for lignite and after extensive on smaller scale has built a 1,600 ton/day oxygen ba plant in 1983 and is going in for a 2,200 ton/day which will use subliterminones coal from Wyoming. Dow Process reacts a coal slurry with oxygen in a cially designed furnace which goes, up to 2600° yield 300 Btu gas and a discharge of water with The process is said to be available for licensing. has obtained a price guarantee or subsidy linked t natural gas price level and estimated to go up to million over 10 years if the natural gas price rema below an agreed level.

But even more important is a development by Ke Co's KRW Energy Systems, Madison, Pa. This focu on a high efficiency low cost gasification techno which can use any grade of coal without the nee Oxygen. A 63MW demonstration plant is being st up. It is a fluid bed gasifier coupled to a gas turbine gas clean-up is also at 1800°F and there is no clean up stage. The gas is of 150 Btu/Cft grade burnable in the gas turbine. 90% of the sulfur is rem in the clean-up and the unit can be retrofitted to e ing power plants. The elimination of oxygen and o clean-up arrangements makes it particularly appe to utility companies which do not market gas. The process is claimed to have big prospects and Chi one of the target areas. Why not India take a lo

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Prime minister wants global action on environment

The Prime Minister, Mr. Rajiv Gandhi, called for dismantling of all nuclear weapons and the removal of the threat of a thermonuclear war which could wipe out all forms of life.

Addressing the 159-nation U.N. General Assembly on 'Environment and Development', Mr. Gandhi also suggested that the international community address itself to safety measures in high-risk industries. He cited the Bhopal gas disaster and the accident at the Soviet nuclear plant at Chernobyl to emphasise how vulnerable the world was.

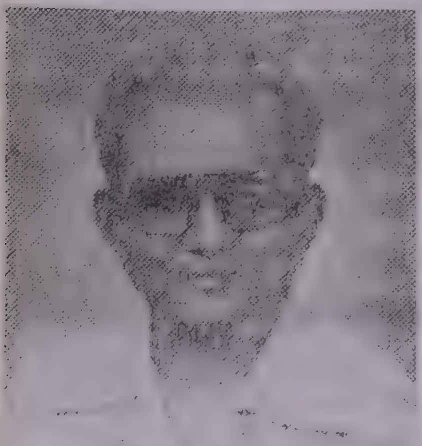
Mr. Gandhi made an overnight halt in New York, on his way from Vancouver to Washington, to address the General Assembly for the second time since he became the Pirme Minister. He chose to speak on environment because the Assembly began a debate on the subject after the Prime Minister of Norway, Mrs. Gro Brundtland, had presented the report of a U.N. Commission on Environment headed by her.

Disregard for harmony

Mr. Gandhi said modern science and the towering achievments of technology had "given us a measure of mastery over nature". Economic progress had, however, led to callous disregard for the harmony within the ecological system. Conservation of the world's environment, he said, required concerted international action to reduce disparities between countries.

The Prime Minister told the Assembly that a world economic system which denied itself the benefits of interdependence was "both unjust and inefficient". He said an average citizen of an industrialised country consumed 10 times more fossil fuels and minerals than his peer in the developing world. The world's resources "cannot sustain such profligate consumption of energy and minerals," he added.

All India chemical & dyes dealers meet



RAMNIKLAL GOSALIA

The All India Chemicals & Dyes dealers are meeting in the 1st week of November at Bangalore to discuss the proposed constitution of a Federation covering all the dealers of India. The proposed Federation will pave the way to all round solidarity and social awareness of dyes and chemicals dealers all over the country. The earlier draft constitution framed by Mr. B. S. Mehra, a leading chemicals dealer of Bombay was discussed at a meeting on 31st July 1987, and 1st August at Bombay. The Chairman of the Adhoc body Mr. Ramniklal Gosalia, a doyen of Bombay's Chemicals market 'Vadgadi', informed our correspondent that the Bombay meeting was well attended by representatives from various centres like Delhi, Madras, Bangalore, Hyderabad, Madurai and Erode. Mr. Gosalia felt the proposed Federation would have an all India character and would act in a unified manner to solve the problems of the traders.

CHEMICAL WEEKLY wishes the Federation a grand success in its noble endeavour.

B. S. MEHRA

GSFC BAGS OVERALL PERFORMANCE AWARDS

The current year's first awar
the Fertiliser Association of India
the best overall performance in
phatic fertiliser production again
to the Gujarat State Fertilisers C
ny. The runner-up award for the
overall performance of ammònia
is also bagged by GSFC. By this
FC has established a record by
ning consecutively for the fifth
the phosphatic fertiliser award.
award will be presented to Mr. M
Raza, chairman and managing di
of GSFC, at the FAI annual semi
New Delhi in early December this

GSFC was the first in the co
to begin the manufacture of dia
nium phosphate (DAP) as far bac
in 1967 and since then the com
has been maintaining a level of p
ctivity in the phosphatic group
plants making DAP available to
farmers in a consistent manner. GS
DAP plant achieved a record cap
utilisation of 145% and the phos
ric acid plant reached a record 1
capacity utilisation in 1986. GS
overall capacity utilisation was as
as 115% during the last year.

The award is determined on
basis of the previous two years'
formance, additional production in
current year over the previous
raw material consumption and ut
tion of phosphoric acid for the m
facture of DAP.

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Dr. O. P. KHARBANDA

Frankly Speaking

O. P. KHARBANDA
Cost & Management Consultant,
501, Olympus, Altamount Road, Bombay-400 026.
(An author of repute and a visiting professor, Dr. Kharbanda consults worldwide including to UNIDO).

Scientists are human too !

Every field of human endeavour has had its share of forgers, charlatans and conmen and science is no exception. But scientists feel uneasy when fraud is discovered in their discipline because of their belief in :

> the esential importance of honesty in science. Unlike other professions where honesty is merely regarded as highly desirable the whole edifice of science is built upon honesty.

This is the observation of Alexander Kohn in his book 'False prophets : Fraud and Error in Science and Medicine' (Basil Blackwell, 1986). A profesor of virology at the Tel Aviv Medical School and editor of **The Journal of Irroproducible Results** was led to the subject matter of this book from some of the nonexistent scientific discoveries, e.g., 'plywater'. Fraud in science has been known to take such forms as 'forging', 'trimming' or massaging (i.e., making data look better than it is) or 'cooking' (i.e. selecting and choosing the 'right' data). Even eminent scientists such as Newton and Mendel have been suspected of being unethical, but Kohn quite rightly comes to their defence. He sees nothing wrong in trying to reconcile theory and experiment through assumptions, as was done by Newton, so long as the theory is further tested through further experimentation.

Two cases of fraud noted by Kohn are worth mentioning here. William T Summerlin is surely guilty since he used a felt tip marker to colour the white fir of a mouse to prove that the so called 'skin graft' from another mouse had proved successful. In the other case Trofim D Lysenko, the notorious Soviet agronomist advocated for many years the benefits of using superphosphate with lime. Lysenko, not well-versed with the chemistry involved, did not realise that mixing with lim
leads to the insoluble starting material (for supe
phosphate) calcium triphosphate and hence is us
less as a fertiliser for all practical purposes. Th
author points out that fraud is more prevalent i
social and biological sciences than in chemist
and other so-called 'exact sciences'.

Maybe, but the same issue of Chem & Eng New
(April 13 1987) which carries a review (Rudy
Baum : 'Dishnoesty in Science' p34-5) also carri
a suspected fraud in the field of chemistry. A co
fession by the Columbia Prof. Ronald Breslo
(C & EN Dec. 8, 1986) confirmed the rumours th
were afloat for several weeks and with this
withdrew three communications from this Journ
of the American Chemical Society based on t
suspect work. Interestingly just a year earlier t
ACS Committee on Professional Relation's su
committee on Professional Standards decided
add the words '& Ethics' at the end of its nam
Scientists consider fraud as the greatest sin
their field since if the scientists can't trust ea
other, 'the whole system would crumble' accordi
(Pamela S Zurer : 'Misconduct in Research' C
EN, April 13, 1987 P10-1) to Joseph F Bunne
chemistry professor, also head of the group of A
journal editors responsible for developing ethi
guidelines. Meanwhile, the student (Monica Me
ta), whose work is the subject matter of this co
roversy has been described as 'an extraordina
bright student' by chairman of Columbia chemis
department, insists on the validity of her resu
and may get a chance to confirm her work at a
ther university at Columbia's expense. Further
velopments would be watched with interest.

CIPET recognised as research centre

The Central Institute for Plastic Eneering Technology at Madras (Ci-) has been recognised for conduct- research in plastic engineering and ymer sciences.

At present, it is a premier institute the field of plastic processing techogy training, consultancy and deve-ment of plastic applications, an of-al release said.

With the proposed coming up of rochemical units in Uttar Pradesh, mil Nadu, Maharashtra, West Ben-, Gujarat, Andhra Pradesh and Kar-aka, the Cipet has also expanded activities through setting up of ex-sion centres in different parts of the intry so that regional imbalance in growth of plastics conversion indu-y can be minimised and all the tes in the country be benefited by ting up new plastic units.

For providing training facilities, five w centres in various parts of the untry have been established. The ension centres at Hyderabad will vide specialisation in engineering stic, at Ahmedabad plastic process- technology and equipment develop-nt, at Lucknow in electronic, tele-mmunication and automation, at opal plastic in packaging, at Bhuba-shwar in housing and at Manipur in ter management. The minister of te for chemicals and petrochemi-s, Mr. R. K. Jaichandra Singh, is rsonally visiting these centres to en-e that necessary training facilities re developed. With the setting up one petrochemical complex, there s scope for five-fold increase in the wn-stream units.

The other purpose of the Cipet is to vide training for entrepreneurship, d also helping industry in producing ality material. At present, due to n-availability of skilled manpower, institute has introduced short-term d special courses for providing skil. e government has also introduced "operators' course" in various in-strial training institutes so that this dustry is supported with adequate illed manpower.

Cipet has established a plastics test- centre at Madras, which is equip-d with highly sophisticated equip-ent like rheometrics dynamic spectro-tre (RDS), furier transform infrared spectrometer (FTIR), and high performance liquid chromatograph (HPLC).

It undertakes developmental projects from industry and also carries out investigative work for solving the problems of plastics industry.

Cipet is also assisting the industry by undertaking design and development of moulds and dies, which is especially important in indigenisation of imported plastics components.

LEATHER SAMPLES : PLEA FOR HIGHER IMPORT CEILING

The Indian Leather Products Association (ILPA) has expressed the need for an urgent revision of the limit of duty-free imports of leather product samples which are sent to the Indian exporters by their overseas buyers, according to Mr. S. S. Sawhney, President, ILPA, in a press release issued at Madras on Oct. 19.

According to the ILPA President, the primary reason for enhancing this limit was that value-added exports had increased from a mere Rs. 52.44 crores in 1976-77 to Rs. 477.39 crores in 1986-87, marking an increase of 910.35 per cent. This massive increase in production embodied a larger diversification of products' design and therefore necessitates a much larger range of samples, he said.

A higher limit was also necessary as the prices had escalated more than five times since 1976, the year the present limits were fixed.

According to Mr. Sawhney, ILPA had appealed to the Union Commerce and Finance Ministries as well as to the Central Board of Excise and Customs to raise the limit of duty-free samples to Rs. 5,000. At present, the limit is Rs. 1,000 every six months for a manufacturer or exporter, the release added.

PDIL TO MEND RCF PLANT

The Projects and Development India Ltd. (PDIL) will assist Rashtriya Chemicals and Fertilisers (RCF) in rehabilitating its old ammonia plant.

According to a press release, an agreement for this was signed in Bombay on October 14. The Rehabilitation scheme is estimated to cost Rs. 56 crores and envisages the use of PDIL catalysts.

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Molasses & ethyl alcohol price control act.

No. 15021/29/87-Ch-II Desk,
Government of India,
Ministry of Industry,
Deptt. of Chemicals & Petrochemicals.
New Delhi, the 25th Sept. 1987

ORDER

S.O. 843(E) In exercise of the powers conferred by Section 18-G of the Industries (Development and Regulation) Act, 1951 (65 of 1951) the Central Government hereby makes the following order further to amend the Molasses Control Order, 1961, namely :

1. This Order may be called the Molasses Control (Amendment) Order, 1987.

2. In the Molasses Control Order, 1961, — (i) under the proviso to sub-clause (1) of clause II, for the existing Schedule and the note thereunder, the following Schedule shall be substituted, namely :

"THE SCHEDULE

(1)	(2)
Grade of molasses	Price
Grade K-I Total reducing sugar by weight above 60 per cent	Rs. 18.00 per 100 kilograms
Grade K-II Total reducing sugar by weight from 55 to 60 per cent	Rs. 15.00 per 100 kilograms
Grade K-III As per specification of Grade I cane molasses	Rs. 12.00 per 100 kilograms
Grade K-IV As per specification of Grade II cane molasses	Rs. 9.60 per 100 kilograms
Grade K-V As per specification of Grade III cane molasses	Rs. 7.20 per 100 kilograms
Below Grade K-V	Rs. 7.20 for every 40 kilograms reducing sugar content therein".

(ii) For the Schedule and the note thereunder, the following schedule shall be substituted, namely :

"THE SCHEDULE
(See Clause 7)

(1)	(2)
Grade of Molasses	
Grade I	Rs. 12.00 per 100 kilograms
Grade II	Rs. 9.60 per 100 kilograms
Grade III	Rs. 7.20 per 100 kilograms
Below Grade III	Rs. 7.20 for every 40 kilograms reducing sugar content.

3. This Order shall come into force on the 1st day of October, 1987.

Sd/-
(Shyamal Ghosh)
Joint Secretary to the Govt. of India.

(For Govt. order on Alcohol refer Chemical Weekly dated Oct. 20, 1987 p. 38)

Government of India,
Ministry of Finance,
(Department of Revenue)
New Delhi, the 1st Oct.
9 Asavina, 1909 (

Notification No.: 230/87 — Cent
Excise

C.S.R. In exercise of powers
ferred by sub-rule (1) of rule 8 o
Central Excise Rules, 1944, the
tral Government hereby makes the
lowing amendment in the notific
of the Government of India in the
nistry of Finance (Department of
venue) No. 117/86-Central Excise,
ted the 1st March, 1986, namely

In the said notification, for the
es and words "Rs. 30/- per to
the figures and words "Rs. 60/-
tonne" shall be substituted.

Sd/-
(C. P. Srivastava)
Under Secretary to the Govt. of I

Government of India,
Ministry of Finance,
(Department of Revenue)
New Delhi, the 1st October,
9, Asavina, 1909 (S

Notification No. 231/87 — Centra
Excise.

C.S.R. In exercise of the po
conferred by Rule 57K of the Ce
Excise Rules, 1944, the Central
ernment hereby specifies —

(a) The goods of the descri
mentioned in column (3) of the T
hereto annexed and falling under
heading number of sub-heading nu
er of the Schedule to the Central
cise Tariff Act, 1985 (5 of 1986)
dicated against such goods in col
(2) of the said Table as the finis
excisable goods (hereinafter refe
to as the final products), and the E
Alcohol used in the manufacture
such final products as the raw mate
to which alone the provisions of
tion AAA of Chapter V of the said
es shall apply; and

(b) Rs. 258 per kilolitre of
Ethyl Alcohol used in the manufac
of the said final products, as the
at which the credit of money is t
given for use of such Ethyl Alco
and stipulates that the grant of c
at the said rate and the utilisa
thereof for payment of duty on
said final products shall be subjec
the provisions of the said Section
and the following conditions, name

(Contd. on p.

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(Contd. from p. 42)

(i) the credit shall be taken only in respect of indigenous Ethyl Alcohol;

(ii) the credit shall be taken only in respect of such Ethyl Alcohol for which the manufacturer has paid the price notified under the order of the Govt. of India in the Ministry of Industry (Department of Chemicals and Petro-Chemicals) No. 15021/6/87-Ch. II Desk, dated the 29th September, 1987 :

Provided that where the Ethyl Alcohol is produced from molasses inside the factory where the said final products are manufactured, the credit may be taken in respect of Ethyl Alcohol produced from such molasses for which the manufacturer has paid the price notified under the order of the Government of India in the Ministry of Industry (Department of Chemicals and Petro-Chemicals) No. 15021/29/-87-Ch. II Desk, dated the 25th September, 1987;

(iii) the credit taken during any calendar month shall be utilised for payment of duty on the said final products only after the commencement of the succeeding month.

(iv) The credit taken may be utilised for payment of duty on any of the said final products and the amount of excess credit, if any available in the credit account, shall not be refunded to the manufacturer or utilised for payment of duty on any other excisable goods.

TABLE

Sl. No.	Heading number or sub-heading number of the Schedule to the Central Excise Tariff Act, 1985.	Description of the final products
(1)	(2)	(3)
1.	2912.00	Acetaldehyde
2.	2915.10	Acetic Acid
3.	2915.20	Acetic Anhydride
4.	2914.10	Acetone
5.	2905.90	Butanol
6.	39.01	Low Density Polyethylene
7.	29.02	Styrene
8.	3903.10	Polystyrene
9.	2903.90	Vinyl Chloride
10.	39.04	Polyvinyl Chloride
11.	2915.90	Vinyl Acetate
12.	3905.10	Poly Vinyl Acetate
13.	3905.20	Poly Vinyl Alcohol
14.	2905.90	Mono Ethylene Glycol
15.	2905.90	Di-Ethylene Glycol
16.	2905.90	Tri-Ethylene Glycol
17.	2711.12 or 29.01	Butadiene
18.	2903.90	Ethyl Chloride
19.	2915.90	Ethyl Acetate
20.	29.17	Diethyl Phthalate
21.	29.17	Diethyl Oxalate
22.	2909.00	Diethyl Ether
23.	2913.00	Trichloro Acetaldehyde
24.	2910.00	Ethylene Oxide
25.	2915.90	Chloro Acetic Acid
26.	40.02	Styrene Butadiene Rubber (SBR)

Sd/-
(C. P. Srivastava)
Under Secretary to the Govt. of India.

SEARLE R & D CENTRE OPENED

The new, sophisticated, Res
and Development (R and D) Cen
Searle India Ltd., was dedicated
search in the service of man-kin
the President of the International
sion, Mr. R. U. Deschutter, G
Searle, United States of Am
(USA), at the Searle factory on
Thane-Belapur Road, Thane.

Speaking at the inauguration
mony of the R and D centre, Mr.
chutter said the sophisticated R a
centre consists of several laborat
designed on modern lines for s
and convenience with all the nec
ry utilities, instrumentation faci
(gas chromatograph-cum-mass spe
meter) and a library, built at a
cost of Rs. 2 crores. The major
of it will be devoted to innovative
cess development for drugs and p
cides.

He said that for the production
bulk drugs, speciality chemicals
drugs and pesticides, it essentially
es process developed by its own R
D. A major recent success was
valerate, a totally indigeniously dev
ped pesticide. In the drugs field, n
roxen (anti-inflammatory) and nif
pine (anti-anginal) were develo
while azathioprine a costly drug u
as an immunosuppressant to prev
rejection of kidney transplant will
developed shortly.

Prof. C. N. R. Rao, Director, Ind
Institute of Science, Bangalore, and
renowned scientist said the R and
centre is of tremendous significance
India since the basic need of India
present is to produce bulk drugs who
demand is estimated at Rs. 20 bill
at the turn of the century. He cal
on Searle to produce drugs which
essential and added that any R and
centre was an integral part of the
dustry.

Dr. R. Goel, President of Sea
India lighted the lamp and termed t
R and D centre as a milestone in d
velopment of new compounds and pr
ducts. The Chairman of the Compan
Mr. H. V. Goenka, said that the com
pany had taken a gigantic stride w
the inauguration of their R and D ce
tre, thereby opening up a new horiz
of development.

Egyptian drugs cos. seek tie-ups

Some of the top pharmaceutical com- nies in Egypt are seeking technical laboration from Indian drug compa- s for the manufacture of basic drugs e doxycycline and paracetamol.

A delegation of Egyptian pharmaceu- al industries, which is currently tour- g India, has already held initial talks r such collaboration with Ranbaxy La- ratories and Amphrey Laboratories o leading drug companies.

Ranbaxy Laboratories is a leading ma- facturer of doxycycline and Amphrey boratories makes paracetamol.

Mr. Fouad Abbas Said, leader of the elegation and also chairman of El oumhouria Co., the state agency for ading in chemicals and medical appli- nces said in Bombay on Oct. 16 that e collaboration with Indian drug com- nies would be mainly for bulk drug roduction.

He said at a meeting organised by e Basic Chemicals, Pharmaceuticals nd Cosmetics Export Promotion Coun- il that several Indian drug companies had achieved enviable position in bulk drug production.

It was not the case with the Egyptian drug companies. Drug units in Egypt are mainly engaged in the manufacture of drug formulations and not in bulk drugs activity. And most of the essential bulk drugs are being imported from European countries.

Speaking at the occasion, Mr. Ramu Deora, chairman of the council said that Indian drug industry has sufficient expertise to offer turnkey projects for the manufacture of various bulk drugs. This was evident from the fact that many Indian drug units had already set up joint ventures in countries like Thailand, Malaysia, Nigeria, Kenya etc.

The technology and processes developed in India are more suitable for adoption in the developing countries, Mr. Deora said. That was why many of the African and Asian countries have preferred Indian technology and expertise.

TURNOVER LIMIT FOR SMALL DRUG UNITS MAY BE HIKED

The turnover limit of small scale drug units for exemption from price control may be raised to Rs. 2 crores from the present level of Rs. 50 lakhs, it is learnt.

A notification to this effect is expected to be issued in a day or two.

The ceiling of Rs. 50 lakhs for exemption from price control for small drug units was fixed as early as 1979. There has been substantial rise in the cost of manufacture of drugs and pharmaceuticals since then.

Informed sources in Bombay say that ceiling prices for category drug formulations would however be applicable to small drug units also although they do not have to file price applications with the government.

The decision to raise the exemption limit for SSI units is expected to result in a substantial rise in the production of essential drugs leading to a general decline in their prices.

There are nearly 12,000 registered small drug units in the country although only about 7,000 of them are working. And out of a total production of Rs. 2,600 crores, the small drug units have a share of 25 per cent.

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Seminar on biotechnology

The Process Plant & Machinery Association of India had organised a half day seminar on 'Biotechnology' on 5th Oct. at Bombay. Mr. P. R. Latey of DGTD inaugurated the seminar. Mr. N. C. Dalal, Chairman of the Association welcomed the chief guest and others. Introduction of seminar was done by Mr. K. P. Mohandas Rao, Dy. chairman of PPMAI. Eminent personalities from the biotechnology field attended the seminar.

In his inaugural address, Mr. Latey urged the meetings of the Association to pay more attention to the fabrication of special equipments needed for the biotechnology industry. He said 1990s would perhaps be the decade of biotechnology.

The following are the extracts from Mr. Latey's speech :

It was nearly 5-1/2 decades ago that one of the great scientists Mr. J. B. S. Haldane had encapsulated the logic behind what is today called Biotechnology. He had said "why trouble to make compounds yourself when a bug will do it for you".

In spite of this early detection of the potential of Biotechnology, it is only during the last 8 to 10 years that it has come out of the confines of the Research and Development Laboratories and is finding applications in industry. We are now perhaps on the threshold of a new industrial revolution — the Bio industrial revolution. If the 1980s is the decade of Microelectronics, 1990 would perhaps be the decade of Biotechnology. The effects of the latter would be more far reaching than those of the revolution started by the Silicon microchip. While the microchip is essentially a devise for handling information, Biotechnology can produce and re-engineer materials — from food to vaccines, from fuels to medicines, and from chemicals to plastics.

Biotechnology is of special significance to us, particularly in the context of our socio-economic objectives. This technology has application in the field of agriculture and food production — so vital for us. For instance, it would help in developing :

- Plants that can grow on land which lies barren due to lack of water or on account of soil salinity.
- Crops which made their own fertilizers.
- In weather forecasting and providing agro-meteriological services.
- High yielding varieties of crops.

Secondly, it has many useful applications in the field of public health, like :

- Vaccines to protect against viral and parasitic diseases.
- Producing better and cheaper anti-biotics.
- New and improved treatments for diseases of the heart and blood vessels, cancer, diabetes etc.
- Techniques for correcting the chemistry of the body to cure hereditary diseases.

Coming to the field of industry, it finds applications in :

- Development of new raw materials for the manufacture of plastics, artificial fibres, adhesives, paints etc.
- Improving the efficiency of fermentation and down stream technologies.

These are only some of the applications, the field is very wide. The Seventh Five Year Plan and the Perspective for 2000 A.D. has therefore emphasised on development and use of Biotechnology, particularly in areas of agriculture, Biomedicals and industry.

The new advances that are taking place are likely to create completely new approaches and techniques, and introduce new concepts.

Developments in the field of Biotechnology offer new opportunities to process plant and machinery manufacturers. The momentum that is being gathered by the technology is fast, and the consultants and machinery manufacturers should gear themselves to take up the challenge. The requirements of plant and machinery for Biotechnology processess would be specialised in nature, and different than what is required by the conventional chemical or machanical industries. The sensitivity factor in Biotechnology is very high. For instance, even minor variations in temperature or pressure, or humidity or pH value, will have a m effect on the output and efficienc the process, which will not be ac table to the user. The manufact have, therefore to develop, design manufacture the required equipm according to the needs of the technologists. The equipment manu turers and the Biotechnologists therefore, intimately linked and sh work in close co-ordination. It may be easy to get the design know or equipments from abroad, as for suppliers will insist on supplyin particular equipment stating that was proprietary in nature, and de ed specifications etc. could not be vulged. Development work has th fore, to be carried out by the manu turers locally.

Different types of equipments instruments would be needed for duction based on Biotechnology. few of these would be :

- Control equipments for ferme tion.
- Bio-filtering and extracts.
- Fermentors / Bioreactors / Bio nerators.
- Backup equipment for labora ries.
- Equipment for Research and velopment work.

I would suggest that the semi may deliberate on the types of equ ment and instruments that would required to be developed. Th should not be much difficulty rega ing the funds required for such de lopment or for updating the technolo from bench scale to commercial p duction. Financial Institutions like IDBI, ICICI could be approached funding suitable projects.

DGTD has set up Technology Ac sory Groups in selected sectors of dustry and one of the Groups is "Fermentation technology and ind trial applications of Biotechnolog The main objective of these Groups to identify the technology gaps a suggest action plans to bridge same. The Group on Biotechnolo is presently in the process of formul ing its recommendations and any s gestions from the Association with gard to the equipment and instrume that may be required to be develop would be very useful.

RTILISER INDUSTRY CRISIS :

'Instant package' mooted

The Fertiliser Association of India s suggested an "instant package" the government to save industry m sickness.

Addressing a press conference at w Delhi on Oct. 16, the chairman the association, Mr. Joseph Kurian, id immediate steps were necessary combat the present situation.

He said in the overall situation of dustry holding high level of invento- es, it was absolutely necessary that mediate support was made available terms of reimbursement of invento- carrying cost on actual basis, in ex- ess of the norms under the retention ice scheme (RPS).

Besides, the premier input supply gencies to the fertiliser industry, in- uding the IOC, CIL and ONGC, hould be advised to give a moratori- n of six months for dues from the rtiliser industry, if only with a view averting any major breakdown in roduction which, besides substantial ss, could also entail serious social nd political tensions.

He said all this needed to be com- ined with rehabilitation of the resi- ual character of imports by instituting buffer on the one hand, and abroga- on of the tender system which during he past one-and-a-half years and given nports the complexion of a free flow- ng material competing and even eas- ng out the indigenous production.

This apart, considering the present vailability situation as also the grow- ng momentum of increased domestic roduction, there was a case for a ery critical scrutiny before authoris- ng any fertiliser imports which should lso cover fertiliser on barter agree- nent, he added.

Mr. Kurian said possibilities could lso be examined to renegotiate any ontracts entered into earlier and ar- ange to import other items of short supply in the country in lieu of ferti- isers.

Defending the RPS, which has been operating successfully during the past decade, meeting the objectives of increased domestic production and consumption leading to higher agricultural production, Mr. Pratap Narayan (FAI) executive director, who also addressed the press conference pointed out that the developed countries in Europe, America and even Japan were also practising comprehensive agricultural price and income support programmes. Their budgetary implications were substantially higher than in India.

He also strongly defended the freight subsidy scheme on fertilisers and said this was also a much "misunderstood concept". The fact of consumer price being unrelated to the cost of manufacturing fertilisers was the unique feature of fertiliser pricing and this should not be lost sight of, he said.

He pointed out that while other commodities like cement, sugar, steel, etc. were subject to administered price controls and revision in consumer prices was allowed from time to time taking into account cost escalation, this did not happen in fertilisers. In fact, despite escalation in production cost due to increase in input costs, utilities and freight, the consumer price of fertilisers today was what it was six years ago, Mr. Narayan said.

Mr. Narayan referred to the "obsession" to reduce illogical linkages and said a number of steps in this regard, though providing temporary relief, had caused serious "distortions" in the fertiliser industry.

He said there had been an "inordinate delay" in the notification of revised retention prices for the fourth pricing period commencing April one 1985, which was announced only by the end of March last year, and payment made after May last year, thus implying serious liquidity problems.

Besides, he said, the delay or denial of certain legitimate charges under the RPS had added to the woes of the industry. While it was almost 10 months now since the railway freight was raised since December last, the same had not so far been recognised in fixation of equated freight.

What was worse was that during the current year, for three months, even at the old rate, payment of equated freight was not made. Also, the steep increase in natural gas price from February one this year continued to remain unabsorbed in the retention prices for the affected units, he said.

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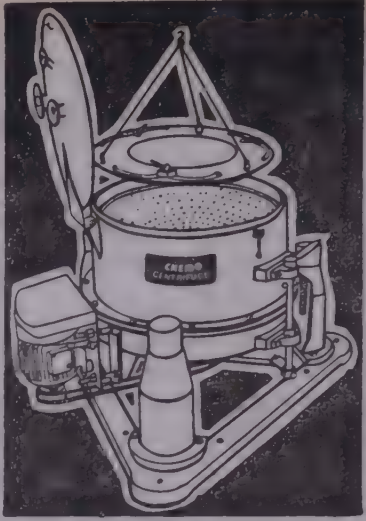

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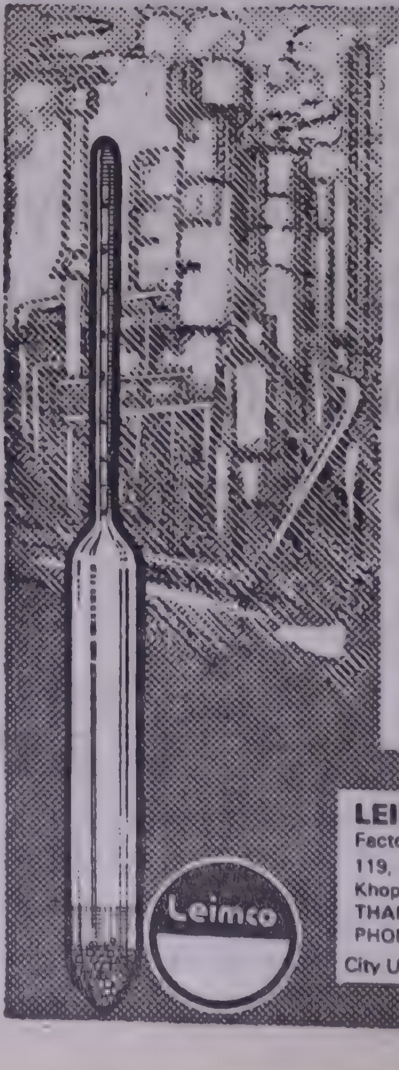

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OGL items opened to export firms

The government has allowed export and trading houses to import raw materials, components and consumables under open general licence (OGL) which hither-to could be imported by actual users only. The items are listed in Appendix 6, list 8, part-I of the import and Export Policy (volume I), 1985-88.

A press release to this effect was issued by the chief controller of imports and exports at New Delhi on Oct. 16.

The government has allowed the new import facility to export and trading houses after examination of the demands made by them at the meetings with the commerce and finance minister recently.

During the discussions, these houses had suggested certain measures which would enable them to boost their exports. One of the suggestions related to the issue of making the additional licences to which these houses are entitled more attractive and meaningful. They had also urged that they should be given sufficient incentives and flexibilities to enable them to play their appointed role.

These houses had urged that the OGL items which they were allowed to import against additional licences were limited and this had resulted in most of the additional licences remaining unutilised. It was suggested that for trading houses to develop their marketing infrastructure abroad, these agencies must also have more import entitlement so that the operations of their foreign offices become viable.

A large number of actual users requiring items in very small quantities find it very difficult to import raw materials and components and would, therefore, find it convenient to utilise the services of the export and trading houses. Also, the building of imports could result in lower costs and thus save foreign exchange, it was argued.

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CHEMICALS FERTILISERS : EXCESSIVE USE HARMFUL

Excessive use of chemical ferti
in some parts of the country is
ving counterproductive.

According to Krishi Bhavan sou
it had been observed that inte
cropping through the cultivation
high yielding varieties with the us
NPK chemical fertilisers is leadin
heavy removal of micro-nutrients.
micro-nutrient deficiency had res
in a 10 to 30 per cent drop in
yield in these areas, they said.

The micro-nutrient deficiencies
caused by intensive cropping thr
the cultivation of high yielding va
es having higher requirement for m
ents, manifold increases in the us
high analysis fertilisers like DPA
urea which are devoid of micro-n
ents, inadequate use of organic ma
es and the cultivation of marginal
problem soils.

Micro-nutrients are the essential
trients required by plants in small q
tities. These include iron, mangan
zinc, copper, boron, molybdenum
chlorine.

The mirco-nutrients being directly
volved in the nutrition of crop, t
deficiency causes imbalances in
plant system affecting the various p
siological activities and ultimately af
ting the crop yields.

According to survey conducted by
Indian Council of Agricultural Resea
(ICAR) under the all-India co-ordina
scheme of micro-nutrients in soils
plants, the deficiency of zinc has b
found to be widespread in Haryana, P
jab, Uttar Pradesh, Madhya Prade
Andhra Pradesh, Tamil Nadu and Bi
followed by iron, copper and man
nese.

There are about 441 soil test
laboratories, including 101 mobile
boratories, to test the soils for nu
ent deficiencies under an Indo-U.
bilateral programme. The Union
vernment has supplied atomic abs
tion spectrophotometers free to vari
states for micro-nutrient analysis.

The government is taking vari
other steps to counter the micro-nu
ent deficiency in soils. Through v
ous extension programmes, includ
training and visit system, farmers
being educated about the proper
of fertilisers, including micro-nutri
fertilisers.

Letter to the Editor

: Editor,
emical Weekly.
ar Sir,

'This refers to the 'Special Article' 'pha Olefin Sulphonates a study", thored by Mr. J. M. Merchant of s. D.M.C.C. and which appeared in -8-87 issue of your esteemed ekly.

We are planning to put up a 'Secon- ry Alkane Sulphonates' manufactur- g plant and would like to refute the ints made by the author in the last ragraph of Table 1 on page 82.

SAS does not cause irritation to the in but on the other hand is 'compa- ble' to the human skin. That is one ason why, quoting, the author, it is xtensively used in Europe'. The com- on European housewife who usually as a more tender skin than the com- on Indian housewife would use it nly if such was the case i.e. if SAS as skin compatible.

To quote some sources, M. Traut- ann and P. Jurges in their article Secondary Alkane Sulphonate — an cological and Economical alternative" ave this to say about SAS.

uote :

"In addition to the previously men- ioned applications which include only etergents, SAS also affords advanta- es when used in cosmetics and to toi- etories. Owing to its good skin olerability, SAS can be used in various formulations as a partial substitute for ether sulfates."

Unquote :

Again, extract from 'Technical Description of SAS plant by Ballestra S.p.A. of Milan, Italy' mentions on pgae II under main merits of SAS.

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lpha Olefins (AO)

demitsu have claimed a novel catalyst for oligo- erization of ethylene to give predominantly AO's pto C_{20} (only 1.6% of ethylene was converted to C_{20}+ AO). The catalyst is based on Zr (e.g. $ZrCl_4$ + ET_2AlCl). Oligomerization occurs at 70-100°C and pressure of 35 atm. A typical product distrib- ution is (% mole %) C_4-30, C_6-30.6, C_8-16.8, C_{10}-8.5, C_{12}-3.5, C_{14}-2.8, C_{16}-2.7, C_{18}-1.8). This is a emarkable claim. (Jpn. Pat. 6259225, March 1987; *Chem. Abst.*, 1987, **107**, 58489).

Nonadecanediols

Hydroformylation of oleyl alcohol has been claimed by Ruhrchemie where a Rh based aromatic phosphine ligand is used; sulfonic groups are incorporated in the benzene nucleus to give high water solubility so that the catalyst can be easily removed by water wash (triisooctylamine is used to give oil solubility for the catalyst). Formyl octadecyl alcohol is formed which is hydrogenated to nonadecanediol. (Ger. Offen 3,534,317, April 1987, *Chem. Abst.*, 1987, **107**, 48497).

Modified Raney Nickel Catalyst for dinitrotoluene (DNT)

Bayer have claimed that a 74-26% Raney Ni-Mo, made from Al-Mo-Ni (10-10-10), is a good catalyst for converting DNT to diaminotoluenes. (Ger. Offen. 3,537,247, April 1987, *Chem. Abstr.*, 1987, **107**, 58639).

4,4' Dihydroxy diphenyl ether (DHDPE)

DHDPE can be made by dehydration of hydroquinone using para toluene sulphonic as a catalyst at 210°C. (Hoechst A-G, Ger. Offen., 3,532,881, March 1987, *Chem. Abstr.*, 1987, **107**, 58642).

Metathesis for fine chemicals

Shell Higher Olefins Process (SHOP) has been responsible for introducing high purity alpha olefins (AO). Higher AO are isomerised and subjected to metathesis with ethylene and other lower olefins to give C_{11}-C_{14} internal olefins. This metathesis reaction has been further exploited (FEAST -Further Exploitation of Advanced Shell Technology). Cyclooctadiene and ethylene are subjected to metathesis to give 1,5-hexadiene and cyclooctene gives 1,9 decadiene.

1,5 Hexadiene can be converted to 1,6-dibromohexane which is likely to be useful for a variety of chemicals. (J. Emsley, *Shell Petrochemicals*, 1987, No.5, p. 22).

Recovery of argon from depleted ammonia plant purge gas

BOC Group of UK have developed a hybrid argon recovery process from the depleted gas (Hydrogen recovery may have been realised via membrane or cryogenic process). A combination of pressure swing adsorption and cryogenic technology has been found to be an effective process as it achieves significant capital and power rovings over all-cryogenic plant. (Krishnamurthy R. **et al.**, Gas Separation and Purification, 1987, **1**, p. 16; This is a new journal brought out by Butterworths).

2,6-Dichlorotoluene (DCT)

Nitto Chem. Co. and Mitsubishi Rayon Co. have claimed that **p** tert butyl toluene can be disproportionated with $AlCl_3$ catalyst to give 3,5 di tert toluene and toluene and the dialkyl derivative on chlorination with SO_2Cl_2 in the presence of $AlCl_3$ give 2,6 dichloro derivative. Dealkylation would then give DCT. (Jpn. Pat. 6205930, Jan. 1987, *Chem. Abstr.* 1987, **107**, 23066).

Trimethyl pentenes from isobutylene

BASF have claimed that isobutylene can be dimerized over zeolite catalyst containing 0.5-7% Bi or Pb at 150°C to give H_2C: $CMeCH_2CMe_3$ - 45.6: Me_2C:CH CMe_3 16.1 and 2,3,4 trimethyl pentenes and trimers 26.6%. (Ger. Offen. 3,542,171, June 1987, *Chem. Abstr., 1987*, **107**, 77300).

Selective chlorination of phenols

It has been claimed that substituted phenols, having at least one unsubstituted *ortho* position, can be selectively ortho chlorinated in the presence of diisopropylamine. Thus a mixture of 2,4 and 2,6 dichloro phenols was chlorinated at 70°C to give 99.6% conversion of the 2,4 to 2,4,6 trichloro derivative (*Chem. Abst., 1987,* **107,** 39382).

Tertiary Amines

Kao (of Japan) have claimed that primary or secondary amines can be reacted with HCHO with vigorous stirring at 3-50 atm. H_2 pressure and 80-180°C in the presence of Pd or Pt or alumina or silica to give the corresponding *tert* amine. (*Chem. Abstr.,* 1987, **107,** 39186).

BASF have claimed that dialkylamines can be reacted with $C_{2\text{-}4}$ alcohols in the presence of Cu based catalysts to give the corresponding *tert amine (Chem. Abstr.,* 1987, **107,** 39187).

Epoxidation of propylene with hydroperoxides

The selectivity of this reaction can be improved by adding on alcohol (e.g. 2-ethyl cyclohexanol) to the reaction media (*Chem. Abstr.,* 1987. **107,** 60, 993).

Alkylation of diphenyloxide (DPO)

Phillips have claimed that DOP alkylation can be carried out with sulphuric acid as a catalyst. Tri *tert* butyl derivatives are useful as dielectrics in transformers and condensers and as plasticizers in polymers, etc. (U.S.P., 4,668,296, May 1987, *Chem. Abstr.,* 1987, **107,** 61022).

Separation of 2,4 and 2,6 dihydroxybenzoic acids

Kolbe-Schmidt reaction of resourcinol gives two isomeric compounds which are difficult to separate. However, principles of dissociation extraction can be employed in view of considerable differences in the ionization constants. Thus acidification of the alkali salts of the reaction mixture to pH 4 allows separation. (*Chem. Abstr.,* 1987,**107,**39406).

Preparation of monohalohydroquinones

It has been claimed that the title compound can be obtained by chlorination of hydroquinone with chlorine generated **in situ** from aq. HCl and H_2O_2. (*Chem. Abstr.,* 1987, **107,** 39396).

Homogeneous vs. Heterogeneous acidic catalyst (ion exchange resins -- cationic)

Lopez **et al.,** have used the test reaction of de ymerization of trioxane to formaldehyde to exam the reaction rates under different set of conditic Bayer's Lewatit SPC 108 was used as a catal A relationship between the resin load and Hammett's acidity fuction exists. The reaction v found to be free from external and internal m transfer resistances when ion exchange resin c alyst were used. (Lopez, L.F., **et al.,** *Applied Ca ysis,* 1989, **31,** 179).

Gas separations with membranes: Selection of material

Membrane separation for gases is now mak inroads into processes based on absorption, pr sure swing adsorption, cryogenic distillation etc. T first breakthrough in the solubility/diffusion bas membranes was in early 70's with Du Pont's holl fibre technology. Koros **et al.** have highlight comparisons between dense-walled and several c ferent types of asymmetric structures (starting w the original work of Loeb and Sourirajan). Trac offs between the use of rubbery and glassy poly ers have been considered and suggestion for opti ization of glassy membrane permeability a permselectivity have been made. It is shown h basic thermodynamics and transport properti allow prediction of utility of modified (poly phenyle oxide) and polyimides, based on pyromellitic dia hydride. Even in the case of PPO separation pro erties can be improved by using a carboxylat variety. (It is also known that a specific polyami gives an overall selectivity for H_2/CH_4 of 417 v 52 for a polysulphone). (*Polymer Engg. Sci.,* 19 **27,** No.8, 603-610).

Calculation of membrane area for gas separation

Saltonstall has given a systematic procedure, w examples, for the calculation of membrane area a specified quantity of gas and the product strea $H_2/Ar/N_2/CH_4/CO/C_2H_6/C_3H_8$ are some of t gaseous species covered. (*J. Membrane Sci.,* 19 **32,** 185).

A new membrane for O_2/N_2/He etc.

Air Products have claimed a new more select membrane which is composed of a dense, permeable polyacetylene matrix coated with a thin, selective fluorinated layer. Lower pressures can be employed (U.S.P. 4,657,564, CMR 1987, 24th August, p. 14). Air products have also carried out innovative integration of cryogenic and membrane separations (*Chem. Eng.*, 1987, 20, july, p. 69).

Ceramic membranes

Alcoa has introduced ceramic multichannel membranes, based on alpha alumina, with a coarse porosity 15 µm pore dia. and 19 µm parallel channels, for operation at higher temperatures. The membrane is made from a thin layer of porous ceramic. For microfiltration, the membrane is available with a pore dia. of 0.2 to 5 µm. (*Chem. Eng.*, 1987, 20 July, p. 67).

Membrane gas separators

Monsanto's first separator was commissioned about ten years ago for the recovery of H_2 from the Ar-purge stream in an ammonia plant. the separation factor decides the purity of the "fast" gas on the low pressure side; multistage membrane separators can obviously give higher purities. The membrane separators may prove to be attractive when gases are available under pressure and high purities are not the goal. This type of separator does not benefit significantly from economies of scale and life of membranes needs to be known more accurately. (Porter, K and Jenkins, J.), *Distillation Supplement, Chem. Engr.*, Instn. of Chem. Engrs., UK, 1987, Sep. p. 23.

Thin film reactors for sulfation of fatty alcohols

Tsuto **et al.**, (of Kao Corporation, Japan) have modelled rising film tubular reactor for sulfation of fatty alcohols with lean SO_3. Side reactions do occur and these are aggravated by higher temperatures. Multitubular reactors with small dia. tubes should be used. (*Kagaku Kogaku*, 1987, **13**,310, Cf., *J. Chem. Eng., Japan*, 1987, **20**, No.3, 332).

Removal of chlorine from 1,2,dichloroethane (DCE)

DCE, as manufactured, may contain 0.1 to 1000 ppm of dissolved chlorine. PPG Ind. (of USA) have claimed that a convenient way to remove the impurity is by addition of higher alpha olefins (e.g. Octene-1). (U.S. Pat. 4,650,916, March 1987, *Chem. Abstr.*, 1987, **107**, 9345).

Benzene (B) to Cyclohexene (C)

Sumitomo have claimed that selective hydrogenation of B to C is possible with Ru based catalysts and in the presence of water, (E.P. 214,530, March 1987, *Chem. Abstr.*, 1987, **107**. 9339).

Catalysis with Nafion

Nafions (perfluorinated ion-exchange polymers) with sulphonic acid groups have been reintroduced by Du Pont after a lapse of few years. As acidic type of ion-exchange resins are unique: non-porous, high acidity ($-H_o = 6$), can withstand 200 °C (against 120°C of Amberlyst 15), etc. Nafion coated on Davison Silica 952 gave an ethylene oxide conversion of 94% with an EG selectivity of 94%; Rohm and Haas XN 1010 gave only 19% conversion with 67% selectivity. Catalytic distillation is possible with Nafions in view of higher temperature stability. (Waller, F.J. and Van Scoyoc, R.W., *Chemtech.*, 1987, July, 438-441).

Catalysis with ultrasonics

(We have covered this topic in this feature on some previous occasions).

Sound waves are reported to have strong influence on chemical reactions, particularly at frequencies above 168 HZ. The formation and collapse of microbubbles (cavitation) seems to be responsible for the noted effects; temp. could rise to 10^4- 10^6 °C and pressure to several thousand atm. Two liquid phase reactions are also affected due to increased interfacial area. Reductions of aromatic halides is a striking example (e.g. **p**-bromotoluene to toluene - 97% yield in 5 hours with ultrasonics **vs.** 20% in 24 hours). Reactions catalysed by PTC have also benefitted with ultrasonics. (Moon,S., *Chemtech.*, 1987, July, 434-437).

Nitration of halobenzene (HB): Improved *para* preference

P. Laszlo and P. Pennebreau have shown that mononitration of HB with cupric nitrate, supported on the K 10 montmorillonite, in the presence of acetic anhydride, in hexane, or in methylene chloride, at room temperature, gives high yield of mono product with high para-to-ortho ratio. Para/ortho ratio as high as 7.5 with chlorobenzene (25 with fluorobenzene) has been realised against 1.8 with HNO_3/H_2SO_4 (6.6 with fluorobenzene). (*J. Org. Chem.*, 1987, **52**, 2407-2410).

Fast and selective oxidation of alcohols under two-phase conditions

Anelli **et al.** have shown that, in methylene chloride -0.35M aq. NaOCl system, with catalytic amounts of 4-methoxy-2,2,6,6 tetramethyl piperidine - 1 oxyl, primary alcohols can be converted to the corresponding aldehydes/acids and secy. alcohols to ketones. Co-catalysis by Br^- and buffering of pH at 8.6 with $NaHCO_3$ are required. Aldehydes can be quantitatively oxidised to acids if a PTC is used. Examples include 1-pentanol, 1-nonanol, benzyl and substituted benzyl alcohols, 2-octanol, cyclohexanol, etc. The reaction occurs even at 0°C and is completed in a few minutes. (*J. Org. Chem.*, 1987,**52**, 2559-2562).

Conversion of halides to nitriles with LiCN

Harusava **et. al.** have shown that in tetrahydrofuran medium halides like **n** C_8I, **n** C_8 Br, C_6H_5 CH_2 Cl (or Br) etc. can be converted in high yields to the corresponding nitriles. (*Tetrahydron Lett.*, 1987, **28**, No. 36, 4189-4190).

Co-catalytic effects in phase transfer catalyzed reactions

Szabo **et. al.**, have shown that in the classic example of alkylation of diethyl melonate with **n**-BuBr, where Aliquat and Benzo-15-crown-5 (crown ether) act as PTC (with K_2CO_3) there is a synergetic effect when two are used together. Thus initial rates (relative basis) which are 80 and 20 with the above catalyst, respectively, become 120 when used together. (*Synthesis,* 1987, No.6, 565).

SO_2removal from flue gas with aqueous H_2O_2

Degussa have developed a method where a wet scrubber issued, with aqueous H_2O_2 injection from sidewalls, to remove SO_2 as sulfate ions (as 70% H_2SO_4). An automatic process control unit measures H_2O_2conc. in the scrubbing-solution recycle and is manipulated to have a slight excess over the stoichiometric requirement; an upstream senso monitors incoming SO_2 levels (Chem. Eng., 1987 14, September, p. 17).

A new impeller

Pandit, Niranjan and Davidson have come out wit a new design of impeller-Convex Bladed Mixe Flow (CBMF) which is superior to available designs The CBMF impeller combines the advantages of the pitched bladed impeller with a principle well-know in the design of the centrifugal pump impeller namely swept back blades. Here vanes are mounted on the boss which fits into the bottom o the vertical drive shaft; vanes are fitted at 45° t the axis of the boss. This new design consume 50% less energy for a specified mixing operatio compared to the 45% pitched blade turbine an about 90% less than a six-bladed disk turbine. It is even more interesting to find that the CBMF use about 60% less energy per unit mass of liquid t disperse sparged gas completely compared with the 45° pitched blade turbine. CBMF can be converte to a high shear impeller by changing the directio of rotation. (*Chem. Engr.*, U.K., 1987, No. 440 (Sept.), p. 21).

Heterogeneous reactions -- Alkenes from polyfunctional aldehydes : stereochemistry

Bigot **et al.** have shown that the use of alkaline carbonates in a slightly hydrated solid-liquid protic organic media allow the synthesis of alkenes from polyfunctional aldehydes with high yield in a E preferential stereochemistry. For instance benzaldehyde reacts with triphenyl butyl phosphoniu bromide, in methanol containing K_2CO_3, at 65°C to give C_6H_5-CH = $CH(CH_2)_2CH_3$ and triphenylphosphine oxide; E isomer was around 73-75% (*Tetrahedron* 1986, **42**, No. 14, 3813).

Interfacial solid-liquid Wittig-Horner reaction: sonochemical effects

Activated barium hydroxide catalyst has been use as a catalyst by Sinisterra **et al.** to assess the son effects. The sonochemical process occurs at roo temperature and with a lower catalyst wt. and reaction time than the thermal process. A small amoun of water is required. (*J. Org. Chem.*, 1987, **52** 3875).

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ENVIRONMENT :

Toxic elements from across the border

Floods have come and gone in north Bengal and elsewhere, but they have left behind a bitter trail. They have not only caused extensive damage to life and property, but also polluted vast areas. The toxic pollutants carried by some of the rivers in spate have begun to cause concern to the State authorities. Tackling the problem is no easy task since it calls for international cooperation writes a special correspondent to **The Hindu** from Calcutta.

The polluted waters of the Mathabhanga and the Churni rivers submerged vast tracts in the low-lying areas like Krishnagunj, Hanskhali and Ranaghat blocks. The corrosive effect of these waters is likely to cause considerable damage to the local economy and ecology. The effluents discharged by a sugar mill across the Indo-Bangladesh border are carried by the rivers according to a water pollution biologist, Mr. S. K. Konar. The Environment Department of the West Bengal Government has sponsored a project to study the pollution problem caused by the two rivers in the district.

Dumping of wastes

Apparently the sugar mill in question does not have facilities to treat the effluents and it is suspected that large quantities of wastes are discharged into the river system through sewers. During the dry season the wastes are dumped into the sewers which remain closed. But in the monsoon the accumulated wastes are discharged into the river, especially when they are in spate. The pollutants are carried by the flood waters across the border into the ponds, tanks, canals, etc.

Mr. Konar's study has revealed that the waters of the Mathabanga and the Churni have been polluted affecting the ecology and the environment of villages in the region. Rural folks use the polluted waters from the contaminated rivers and ponds. Mr. Konar's
findings have underlined the nee
extensive study of the adverse ef
of water pollution on the ecosy
of the region.

The aquatic life has also bee
by the pollution. According to
State Irrigation Department offi
pollution of the Churni near Na
wip and its adjoining areas has ass
ed alarming proportions. In some
as, fish and other creatures have
in large numbers, especially during
dry season. Studies conducted by
vironment experts have confimed
magnitude of the pollution proble

Heavy siltation is another prob
The studies have indicated that
rate of seed germination has been
versely affected by the pollutio
water in some agricultural tract
this menance is not contained, agr
tural production in the affected a
is likely to suffer in the coming y

The State Government has been
ing to enlist the cooperation of
gladesh to tackle the problem. Ac
ding to the Irrigation Department
cials, Bangladesh has not yet resp
ed to the suggestion for a joint
spection of the Churni river in N
district.

Need for joint survey

Perhaps Dhaka is not too keen
joint survey during the dry sea
but the West Bengal Government
cials feel that only then the true n
of the pollution can be assessed.
job will be difficult when the ri
are flushed by rain waters. But
two governments can ill afford to
fer a joint survey since the pollu
problem is becoming acute due to
curring floods in the monsoon.

It is reported that a paper pulp
tory has been set up on the Ba
desh side of the Churni. The wa
injected into the river from the fac
can cause serious problems to pe
on this side of the border. Hence
need for mutual cooperation to
bat the menace is required.

After the partition, the river
north Bengal have become intern
nal in character. The flood control
water management programmes in
region call for cooperative efforts
ween West Bengal and Banglad
Unilateral action on this issue
only complicate matters causing
ship to people on both sides of
river.

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lready there is a kind of undec- competition between the two tries over measures to check ero- of land caused by the rivers. has hardly been in the interest e rivers as a whole or of all the le living on their banks on both s of the international boundary," Mr. Sunil Kumar Munsi, presi- of the Geographical Society of a.

What is needed is a joint India- gladesh commission for the limited pose of drawing up a concrete pro- mme of action for the management of the small rivers of the north Bengal plains — the common habitat of people of both the countries living in the north of the Ganga-Padma divide, provided of course, that such a commission does not follow the sterile footsteps of its predecessor, the Joint Rivers Commission," Mr. Munsi said.

While Mr. Munsi has advocated cooperation between the two countries on a wider scale, the Irrigation Department officials have been trying to get the dialogue started on the "pollution" issue. They are still awaiting a positive response from across the border.

Approach to pollution

e Economic Times comments edi- ally :

he strident reaction of industry — PHDCCI acting as its spokesman to tighter enforcement of measures control pollution at source is unfor- ate. By describing pollution con- standards as "too stringent" and ficult to achieve", industry has veyed the impression that it is re- tant to take up pollution control in nest. If this impression gains stren- in the public mind, industry will dly be able to ward off the stricter nishment, including closure of de- t industrial units, which Central state pollution control boards are posed to be allowed to mete. How tified is industry in claiming that lution standards are 'too stringent'? e ministry of environment and ests (MEF) describes the standards minimum national standards.

t would be simplistic to say that ngent standards are being officially cribed as minimum standards ugh, since they must be effective ir threshold level may be high at minimum in terms of the expen- ure on the required plant and equip- nt. The MEF annual report for 36-87 states with respect to the mi- num standards developed for pesti- es industries that "the aspect of ievability of limits with presently ilable technology is under review the board". Surely this is indica- of the fact that the authorities try match standards to available tech- ogy. Industry's criticism on this re seems weak.

The point at issue is not really the ndards or penalties prescribed, but cost of pollution control equipment. high cost of such equipment leads industry to phase out and postpone investment. Industry needs knowledge about pollution, about the equipment needed to control it, about the availability of the required equipment and finally the wherewithal to finance investment in pollution control. The pollution controlling agencies could usefully prepare model schemes for implementation of pollution standards.

The pricing of goods made by pollution-prone industries would present a problem. Cement, synthetic fibre and chemical plants, for instance, will require larger amounts of capital for a given output. The general proposition that the posts of pollution control should be internationalised is valid. The question is whether it is feasible to do so in one go. Industries which are pollution-prone may find their financial projections going awry if they have to bear the entire cost of pollution control. Their ability to pass these costs on to their consumers in higher price is obviously limited by the nature of the demand for their products and the availability of substitutes. Thus the question does arise: should the cost of additional investment needed for pollution control be passed on to the consumers of the concerned industry's product through an increase in prices or should the general taxpayer be asked to share the costs since he also benefits from pollution control? In short, what should be the extent of internalisation of costs, at least to start with ?

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Stress on pollution elimination

The Union Minister of Environment, orests and Wild Life, Mr. Bhajan l, has called upon industry to take mmediate steps to eliminate pollution ithin a specified time-limit. He reets that the distillery industry has ot carried out adequate pollution conol measures so far.

Inaugurating a workshop on "polluon control in distillery industry" at ew Delhi on October 17th, he described pollution as the country's bigest problem. It was necessary to enure that industrial growth took place ithout adeversely affecting the envionment, he said.

Referring to the penal provisions in he Environment Protection Act, Mr. hajan Lal said the Government had o intention to cause any hardship to ndustry. The Government would take lenient view if any particular indusy gave an undertaking to complete ollution control programmes within n agreed time-frame.

Mr. Bhajan Lal reiterated the Govrnment's decision that in future licenes would be given only to those proects which provided for pollution reatment plants. Their commissiong would not be allowed till the work n the treatment plants was completd. He suggested that it would be in ndustry's own interest if pollution ontrol costs were included in the proects outlay.

Welcoming the Minister, the FICCI nvironment sub-committee chairman, r. Chirayu R. Amin, said industry's ommitment to the cause of environent was total and unequivocal. Hower, the funds required for the purose were large and not easily availale.

Mr. Amin urged the Government to ccept phased pollution control prorammes, evolve realistic targets and rovide less stringent punishment to nits which had implemented the proramme up to a certain point.

He suggested that the Central Board f Pollution Control set up appropriate ata banks for different industries to rovide information available, technologies, their cost and benefits and how they could be grafted to old units.

The President of the All-India Distillers' Association, Mr. P. S. Sandhu, urged the Government to accept the Association's phased pollution control programme proposal for distillery industry by which 80 to 90 per cent of the pollution would be eliminated in a year's time.

Dr. Wan Den Akkar, Director, Department of Clean Technologies, Netherlands, gave a resume of the pollution problem in his country, steps taken to control it and the relative merits of different technologies.

Organised jointly by FICCI and the All-India Distillers' Association, the workshop was attended by representatives from the Government, distillery industry, equipment manufacturers and academic institutions from India and abroad.

RAMU DEORA IS FIEO PRESIDENT

The new Managing Committee of the Federations (FIEO) elected Mr. Ramu S. Deora, Chairman, FIEO (WR), as its new President at the metting held in New Delhi on Oct. 7.

Mr. A. S. Chatha, Chairman of Punjab Small Industries and Export Corporation Ltd., was elected Vice-President. Mr. Deora takes over from Mr. V. P. Punj.

The FIEO Managing Committee was reconstituted recently under instructions from the Ministry of Commerce and elections held recently to provide more representation to export promotion councils, tha small sector and State corporations. Mr. Deora represents both the councils as well as the small sector.

Mr. Deora is the Chairman of Chemexcil and the Drugs and Pharmaceuticals Council of the All-India Manufacturers' Organisation. Recently, the Ministry of Commerce also appointed him Chairman of the Export-Import Advisory Committee (Western Zone).

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A difficult task

e Financial Express comments edi- ially :

t is obvious from the assessment demand for drugs, as made by the cretary to the Government of Checals and Petrochemicals, Mr. H. K. an, that the drug industry will have intensify its efforts to reach the al of "health for all" by the turn this century. The industry will have step up the production of drugs by out Rs. 14,000 crores. The indusy produced formulations worth a lite over Rs. 2,100 crores in 1986-87. will have to raise this level by about s. 1,000 crores each year for enaling the entire population to get the enefit of modern medicines by 2000 D. The leeway to be made up will e evident from the fact that since 980-81 the output of formulations as gone up by only about Rs. 150 rores a year. The industry has yet to each even the original Sixth Plan target of Rs. 2,450 crores for formulaions. It may be recalled that the industry had missed even the revised Sixth Plan target of Rs. 1,950 crores by a wide margin of Rs. 123 crores. Not surprisingly, the industry's immediate concern is to accelerate the pace of production to reach the Seventh Plan targets. The industry will have to more than double the output of bulk drugs to reach the target of Rs. 1,033 crores, while the output of formulations will have to be stepped up by about 70 per cent to reach the Plan target Rs. 3775 crores.

The Government and the industry will have to act in concert to attract fresh investment on a large scale, so essential for boosting production. The industry's capacity to plough back funds has diminished over the years because of the declining trend in profitability. The industry's profit before tax as percentage of sales gradually declined from 15.47 in 1969-70 to an estimated four in 1986-87. As a result, not only the industry lacks funds to plough back but also fresh investment has become scarce. This is fully reflected in the fact that investment in the industry has gone up by a mere Rs. 100 crores to Rs. 700 crores since 1983 the government had claimed that the new drug policy announced by it in Dec. 1986 was aimed, among other things, at "creating an environment conducive to channelising new investment into the pharmaceutical industry, to encouraging cost-effective production with economic sizes and to introducing new technologies and new drugs." This had naturally raised the hope of the industry that the Government would use the price control mechanism to stimulate growth of the industry. Unfortunately, the Drugs (Prices Control) Order (DPCO) 1987 issued in August 1987 has belied the hope of the industry. The industry has complained that several provisions of the DPCO 1987 go counter to the Government's objective of reducing the span of control. Although the mark-up provided under the DPCO 1987 is reasonable the wording of the relevant provision is such as to leave room for arbitrariness in price fixation. The industry has also complained that classification of drugs for the purpose of price control leaves a lot to be desired. The Government has neither redressed the industy's grievance that provisions for bonus in excess of the statutory minimum, bad debts, charities, etc. are disallowed nor permitted the industry to recover expenses on research through the pricing machanism, moreover, the Government has yet to announce revised conversion and packing norms. Not surprisingly, therefore, the industry is not optimistic about generating internal resources and attracting new investment. The Government will have to look into the matter for bringing the goal of "health for all" within the reach of the industry.

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HBJ-Gas : in search of users

Effective use of gas available through the HBJ pipeline may not materialise fast despite the best efforts of the authorities concerned. This follows the delay in the implementation of the three private sector fertiliser plants along the HBJ pipeline route.

Even though the letters of intent of the three parties continue to be extended, the latest one having been given for six months, officials in New Delhi are keeping their fingers crossed : There is no knowing what steps will be taken to convert the letters of intent into industrial licences and for planned commissioning in the foreseeable future.

Proposals for alternative uses of the available gas for generation of electricity were mooted earlier; in view of the delay in setting up the three private sector fertiliser plants.

It was proposed that gas could be supplied to the Delhi Electricity Supply Undertaking (DESU) and the industries in Faridabad. In addition, units like IEL and IPCL had evinced interest in using the gas piped in through the HBJ pipeline.

The government attitude to the proposal appears to be lukewarm even though the Gas Authority of India Ltd. (GAIL) is threatened with a loss of about Rs. 1,500 odd crores following the non-utilisation of the available gas. The proposals envisaged the construction of spur lines along the pipeline with a view to providing the gas to the newly found customers. Of cource, if these proposals are accepted it may also entail renegotiation of the contract with the consortium building the pipeline. The HBJ pipeline is expected to be completed within the next few months and yet there will be no assigned takers of the available gas especially the private sector fertiliser plans that were to come up along the route.

Accordingly, with a view to utilising the available gas, proposals for use by Desu and others were mooted. The idea was that till the private sector fertiliser units come up, these eager consumers could use the gas pr bly. This would also have he GAIL in cutting down its losses about 50 per cent.

In fact, one learns that even the SEB has submitted a proposal for setting up of small gas based p along the HBJ route in UP.

Meanwhile, it is said that the vate sector units that were setting the fertiliser plants along the route have expressed their own ap hensions over these proposals. fear is believed to be that when proposed plants come up along HBJ route, as envisaged origin they may not get the promised This is because the new consum like Desu and others would alre have been committed to the requ gas.

Sources in New Delhi howe point out that if there are any s fears it would be well to disc them immediately. Adequate assu ces, it is said, have been made to parties concerned on this acount.

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ASSAM PLASTIC UNITS HIT BY LDPE SHORTAGE

The 73 plastic processing units Assam in the small-scale sector currently facing a severe shortage raw materials like the other 20, units in the rest of the country.

The Assam units were further h dicapped with the IPCL not willing maintain a regional stores at Guwh as the total requirement of LDPE Assam is less than 500 tonnes.

Delivering the keynote address the workshop on better marketing st teg es of quality plastic products development of plastic industries Guwhati on 15th October organis by the directorate of SISI and the vernment of India, Mr. T. L. Bar IAS, director of industries Assam, s that plastic scenario all over the co try was no better than what was Assam.

High excise duty on plastic produ of units where investment was m than Rs. 7.5 lakhs resulted in fragm tation of the industry into nea 20,000 units in the small-scale s tor, where sophisticated technolo such as injection moulding, blow m ulding or compression could not introduced.

Consequently, about 50 per cent the country's total units use the si plest technology

Fillip to ONGC's seismic Data processing capability

ith the recent installation of the n frame IBM 3083 JX 3 computer th about $14 million at the Geo- Processing Interpretation Centre opic), Dehradun, the seismic data essing capabilities of Oil and Natu- Gas Commission (ONGC) has re- ed a significant boost.

ill last August end, the newly in- led system had completed 6493 of seismic data processing, 1211 of seismic migration and VSP pro- sing for eight wells, resulting in a saving of about $0.9 million.

rough cost analysis of the IBM 3 computer operation, according to GC sources, indicates that with op- um capacity utilisation, the cost of cessing per km. is expected to be ut $43, compared to the present ernational lowest quotation of $54.

NGC sources feel that the success- installation of this computer is only a breakthrough in processing acity but also a creditable achieve- nt in seismic interpretation. This e frame computer would help meet bulk seismic data processing re- rements of all the regions, and for ing up special processing, software elopment and interactive interpre- on tasks.

he largest capacity system IBM 3 JX 3 has a central memory of mega bytes with 24 channels. The disk capacity is around 25 giga es, it has 40 tape drives and 60 ninals, 2 work stations, four plot- and four array processors.

eismic software of western Geo- sical Company has been installed processing 2D and 3D seismic . Interactive interpretation work ions called "crystal" have also n attached to the large system. system is capable of processing nd 40,000 standard records per .

NGC has been continuously add- to its data processing capabilities rder to match with the growing scientific data (mainly seismic). IBM 370/145 system was install- in 1975 and the subsequent addition of VAX 11/780 in 1981 could not meet the increasing data processing requirements of ONGC.

During this time onshore and off-shore activities got a spurt, and a more rigorous exploration plan was launched by acquiring another fully equipped marine vessel "Sagar Sandhani" and increasing the onshore parties to 50.

Moreover, quantity of seismic data had also increased because of the usage of more number of channels in the field to improve the quality of the seismic data. As inhouse processing facilities were not adequate to meet this growth, a large amount of data had to be sent abroad for processing. The amount of foreign exchange involved in this regard was of the order of Rs. 4 crores per annum for data processing alone.

Therefore, to augment inhouse processing facilities, a massive computerisation plan was launched for having a large scale computer at Dehradun, and five main frame computers at various regions of ONGC. Also, a proposal was made to acquire many mini and micro-computer systems for business and commercial applications. After inviting global tenders, orders were placed for six large computers.

The most sophisticated system IB JX3 was commissioned at Geopic, Dehradun. Two regional systems namely Tata Elexsi and Geco have been installed at Bombay and Madras respectively. One Rússian EC-1061 systems are on order for Baroda and Jorhat.

The regional systems are meant to meet the immediate processing needs of the regions and for quality control for data acquisition, processing for rush interpretation jobs and to take up regional VSP processing and systematic seismograms generation. They would also be used for developing exploration data bases and information systems and to meet other geo-scientific processing needs.

The total investment on these six large computers is around Rs. 60 crores, inclusive of the cost of infrastructure. All the computer centres have 3D data processing and interactive interpretation capability. The four large systems already operational have capabilities of processing around 15.5 million standard (MSR) records of seismic data. With the installation of two Russian systems at Baroda and Jorhat during 1988-89, the processing capacity will be augmented by another one million standard records per annum.

The major part of this processing capability is planned to be utilised for seismic data processing. The balance capacity would be utilised for on-line interactive interpretation work stations, non-seismic data processing like gravity, magnetic, geological and exploration data bases and information systems. As per the existing plan, the inhouse processing capacity would go up from 12.3 MSR in 1987-88 to 16.6 MSR in 1989.90.

ONGC SCHEMES

The Oil and Natural Gas Commission will soon begin offshore oil exploration in Kerala, Cambay and parts of West Bengal, the ONGC Chairman, Col. S. P. Wahi, said.

Col. Wahi said that exploration was already on in the Himalayan foothills of Jammu and Kashmir and Himachal Pradesh, besides Surinsar in West Bengal, Ankleshwar in Maharashtra and the Ganga Valley. Prospects of finding oil in these areas appeared bright.

The ONGC chief said production in the first offshore oil well at Bombay High was now five lakh barrels a day. Apart from Bombay High, three offshore oil fields had also been developed in the West Coast, he said.

The commission's scientists were working on data connected with the discovery of basement oil in Bombay High which is likely to extend the field life of the oilfield.

BOOST TO MINING SECTOR

The Centre has extended to the mining industry the benefits of hundred per cent export-oriented units, official sources said in Chaibasa.

Under the new benefit scheme, the mining industry will be allowed to import components and spares free of duty to increase its production for export purposes.

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Petrochem project for Vizag feasible reports panel

The scope for an integrated deve-
opment of petroleum and gas re-
urces in Andhra Pradesh for the be-
fit of the southern and eastern re-
ons was very high and could be en-
nced by taking timely steps for in-
structural and industrial invest-
ents.

This was highlighted in the pre-
vestment feasibility report for a pet-
-chemical complex at Visakhapat-
am, presented to the Chief Minister,
r. N. T. Rama Rao, by Dr. Bhanu
rasad, Chairman, APIDC, at Hydera-
ad on Oct. 12th. Mr. B. N. Yugan-
har, Secretary Industries and Mr. V.
. Srinivasan, Special Officer, Petro-
hemicals were also present.

Dr. Prasad who was also the Chair-
nan of the Committee on Gas Based
ndustries, which has just completed
ts deliberations in the optimum uti-
isation of gas from Krishna-Godavari
asin, indicated that in the Commit-
ee's view, the composition and quan-
ity of gas would justify investment on
mmonia urea facilities, a sponge iron
lant, a combined cycle gas turbine
ower station with a capacity of 270
MW (3 no. s. of 90 MW each) cera-
mic and metallurgical industries, in
which the use of gas can contribute
o process efficiency and economics.

The need for providing necessary in-
rastructural facilities for accelerating
gas and oil development was also em-
phasised by Dr. Bhanu Prasad.

Dr. Bhanu Prasad outlined the details of the strategy for development of olefin capacity utilising the surpluses of naphtha from the 4.5 mn TPA Vizag Refinery of Hindustan Petroleum by establishing a cracker to process seven and half lakh tonnes of naphtha, ethylene, propylene, buetadine and other streams and downstream projects for manufacture of polyethylene (1,60,000 TPA), vinyl chloride (1,50,000 TPA), polypropylene (1,30,000 TPA), and for earmarking certain intermediates as raw materials for other industries.

The total investment on plant and utilities as also site development was placed at Rs. 1880 crores with a foreign exchange of Rs. 380 crores.

It was stated that the necessary techno-economic analysis and financial analysis carried out by experts in the field showed that the project investment would yield a high return on investment and have a short payback period.

Dr. Bhanu Prasad explained to the Chief Minister that the Union Industry Miniser, Mr. J. Vengal Rao, and officials of the concerned Ministries had shown ready appreciation of the potential for the petro-chemical industry in the State. Mr. Rama Rao is understood to have appreciated the cooperation received from Central Department, according to an official spokesman.

Tracing the background for the naphtha cracker unit at Vizag, official sources pointed out that a cracker with a capacity of 75,000 TPA was mooted as early as 1961, then the Union Government preferred locating it at Bombay, which was having two refineries. In 1969, once again APIDC applied for setting up a cyclic cracker based on low crude oil with a capacity of 2.10 lakh tonnes per annum. Owing to naphtha shortage then, the proposal was not accepted by the Government.

Again the possibility of the Vizag naphtha project came up in 1986, when the committee was appointed to draw up a perspective was upto 2001 and suggested setting up of a olefin capacity at Vizag and other places and an aromatic complex at Madras. A letter of intent was then applied by APIDC which is likely to be favourably considered for inclusion in the Eighth Plan.

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Problems in pipeline transportation of crude

Use of pipelines is the most economical method of transporting crude oil. In this mode, transportation is uninterrupted by conditions of rail, road, weather, and disturbances like strikes and floods. Also, the volume of oil to be transported can be regulated according to the facilities available at the receiving end.

There are two broad categories of crude oils — high sulphur, low wax crude and low sulphur, high wax crude. Low sulphur, high wax crude possesses high viscosity and pour point (gelling point) due to the high wax content. Transportation of such crude needs special pipeline technology. It is pretreated before pipeline transportation to bring down the viscosity and pour point.

Nearly 75 per cent of the crude oil produced in India is waxy needing special pipeline procedures for its transportation.

Pre-treatment

Among the many pre-treatment methods, the following are in commercial operation in the world :

— Heating the crude and pumping the hot oil.

— Transporting it in the form of an oil-water emulsion.

— Dilution with lighter crudes or fractions to bring down the rheological properties.

— Applying a predetermined heating-cooling cycle (conditioning) to the crude oil to lower viscosity and pour point.

— Treating with chemical additives to change the wax crystal shape and size to prevent their interlocking into a gel.

Adoption of any of these methods is a matter of convenience, economics and availability of other facilities to implement it. Each method has its advantages and disadvantages.

Out of 2,678 km. of crude oil pipelines in India, about 2,600 km. lie in zones having surrounding temperatures lower than the pour point of the crude.

Oil India Limited in the northeastern region transports its oil by conditioning. In this method, the crude is subjected to a controlled heating cooling cycle to change the initial high viscosity and pour point to a lower value to suit the pipeline operating conditions. Two conditioning plants, one at Duliajan and the other at Moran, are in operation. But the method is capital intensive and relatively high in operating costs.

With the discovery of Bombay High crude, and the Geleki field in the eastern sector by the Oil and Natural Gas Commission, it has become necessary to re-examine the available pretreatment methods. The Bombay High crude has a high wax content (11.4 per cent) and the pipeline from the fields to the Uran shore terminal is the longest sub-sea line (230 km, 30" diameter). A committee constituted by the Government has recommended the use of chemical additives for transportation of ONGC crudes.

However, chemical additive treatment entails large recurring expenditure on chemical. The ONGC is spending around Rs. 20 crores in foreign exchange on import of this chemical.

Pumping conditions

In pipeline transportation of crude, two distinct pumping conditions are to be identified — dynamic pumping condition and static shut down condition. For economic reasons, crude oil pipelines are always under dynamic condition. But shutdowns can occur for many reasons, both voluntary and involuntary. Under the static condition, the crude cools down very slowly leading first to nucleation of wax crystals which, on further cooling, grow to a well defined network of crystals which interlock and become gels.

Sometimes the strength (or the energy) required to break these gels is so high that the available pumping pressures are not adequate to break these gels and restart the pipeline.

The knowledge of the peak stress needed to break these gels and restart the pipeline is very important in waxy crude oil transportation. It is essential to ensure that the crude oil pour point viscosity and yield strength are always below the pipeline design parameters. A number of laboratory evaluations are made to estimate these properties for safe transportation and restartability of the pipeline.

The chemical additives used to bring down the vicosity and yield stress are known as pourpoint depressants or flow improvers. They are synthesised from special monomers alkyl acrylates, vinyl ester of l chain fatty acids, ethylene copolym of vinyl acetate etc. These polym when added in ppm (parts per m lion) quantities, have a remarka ability to alter the rheological prop ties of waxy crude oils.

An altogether different type of lymeric compounds also increases flow of oils. They are known as di reducers. They do not reduce the po point or the viscosity but act by entirely different mechanism. The are long straight chain polymers very high molecular weight (unlike t flow improvers, which are branch chain polymers).

Under low energy state they are a coiled form. When added in pp quantities continuously to turbulent flowing crude oil they tend to elong te and in the process destroy the e die currents and tend to make the tu bulent flow laminar. By changing th turbulent flow to laminar the line ca pacity is increased. These chemica are highly effective with low viscosit oils flowing under high turbulent con ditions. The activity of such chemical on flow improver treated waxy crud oils is still not established.

Wax deposition problem

The most annoying problem in trans poratation of waxy crudes is the wa deposition due to cooling. This caus es a pressure drop and then reduce the flow rate and line capacity. Ther are mechanical and chemical means o combating this problem.

While the Bombay High crude ha a pour points of 30°C, the sea-bed average temperature in all the seasons is below the pour point at 20 to 24°C Therefore, the oil is additive treate to bring down the pour point to 18°C and is transported by the submarine pipeline. There are severe wax deposition problems.

Some of the crude produced is also transported by tankers to Salaya from where it is transported by land through the 1218 km Salaya-Viramgam-Mathura (SVM) pipeline to the Mathura refinery. Tanker transported crude is also additive treated before loading. The transportation of crude oil is the most challenging job facing both the ONGC and the Indian Oil Corporation.

Dr. V. S. Bhaskar Ra
Regional Research Laboratory,
Hyderabad

Courtesy : The Hind

New products

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British company (Tecvac Ltd.
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ate the surface and form nitrides
e interstices of the crystal lattice.
effect is to eliminate the forma-
of microcracks which can lead to
onset of fatigue failure, and at
same time to harden the surface.

undamental characteristics of the
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t at which there is any risk of
rtion or dimensional change. It is
possible to treat the surface of
e-tolerance dies and moulds with-
affecting their shape, dimensions
nderlying hardness. The effect can
le, or even multiply by a factor
0, the wear resistance, and hence
ife of a component.

e process also promotes the for-
n of stable oxides, which redu-
rictional forces, and can be used
hance the performance of carbi-
and ceramics as well as that of
s.

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a choice of vacuum chambers,
the ion-beam source can be ar-
d to project vertically or horizon-
or at an angle which can be
ed during processing. A particu-
ature is that the unit is micropro-
r controlled to ensure the opti-
ion dosage

e equipment can also be used
e production of ion-assisted coa-
where, for example, titanium va-
generated by an electron bom-
ent source is mixed with the
of nitrogen ions. The effect is
tanium, some of which becomes
m nitride, is forced into the
lattice so that the coating becomes a part of the substrate material rather than simply adhering to its surface.

LACQUER

A clear, spray-on lacquer developed in Britain (H. Marcel Guest Paints Ltd., Riverside Works Collyhurst Road, Manchester, England M10, 7RU) to protect the engines of new cars has the bonus of giving a high-gloss lustre for enhanced showroom appeal. The 'ARG 141B' underbonnet lacquer is also available in a range of colour finishes, where this is required for use on reconditioned engines.

Conventional practice is to coat engine parts with a wax-based system for protection. This gives a sticky finish which tends to become contaminated with dust and dirt and can give an unpleasant smell when the car is first driven. The newly developed lacquer is said to overcome these problems and to give improved long-term protection at a competitive price.

The lacquer offers excellent adhesion on ferrous metals and good adhesion on non-ferrous metals and polymers other than polythene, giving protection to all the component materials in an engine, including aluminium, painted steel and rubber. It will withstand a 500 hour salt spray test on steel with, according to the company, an even greater protection performance under engine operating conditions. It withstands continuous hot and cold cycling and is steam cleanable. The lacquer can be applied by electrostatic or conventional spraying.

JAPAN MAY BUY LEATHER GOODS

Japan is keen on importing finished and semi-finished leather from India as it wants to avoid tanning because of the pollution problem.

This was indicated in October 12, by Mr. Kenji Maruno, the leader of an eight-member Business Mission from the Tanners' Council of Japan to South East Asia.

Addressing a group of local leather exporters at the Council for Leather Exports, he said Japan was now depending on Taiwan and South Korea for the import of these items. Pollution from tanning was considered a major hazard in his country, the mission leader said.

When it was pointed out by the CLE Chairman, Mr. Mohammed Hashim, that the Union Government was committed to a policy of phasing out the export of semi-finished and finished leather, Mr. Maruno said Japan would then review its strategy.

Mr. Hashim said that even now export of semi-finished leather from India was being done under a quota system. The export of finished leather, which now formed 50 per cent of the total exports, was likely to be brought down to almost nil by 1990. The Government, he said, wanted the product exports to form 90 per cent of total leather exports.

At any rate, Mr. Hashim explained there could not be a long-term business arrangement with Japan if that country wanted to import only semi-finished or finished leather from India, given India's emphasis on export of value-added products.

A member of the delegation said on an average, Japan imported 40,000 dozen leather garments and 25,000 pairs of shoes per month from Korea and Taiwan.

The delegation inspected samples of finished leather and products at CLE. It is scheduled to visit manufacturing facilities and explore the possibility of importing leather products such as shoe uppers, shoes, garments etc.

PLEA TO CUT INTEREST ON EXPORT ADVANCES

Exporters have urged the government to further reduce interest on export advances by banks to give a boost to exports.

The suggestion was made at a seminar on exports organised by the Punjab National Bank in New Delhi recently.

The exporters also called on banks to finance them for the money needed for procuring quotas from the export promotion council.

The PNB general manager told the seminar that it proposed to open specialised branches for dealing with foreign exchange transactions. These branches would have trained staff and infrastructure for providing smooth and efficient service to exporters and importers.

SCIENCE AND SCIENTISTS

Nobel winner's genetic insight

From the moment, three weeks ago, when he became one of the three latest recipients of the prestigious Albert Lasker Medical Research Award, it was clear that Dr. Susumu Tonegawa was a strong contender for the Nobel Prize in Physiology and Medicine this year. That expectation came true when the Karolinka Institute Stockholm, invested with the responsibility of selecting the Biology Nobel Prize, announced him as the winner.

Dr. Tonegawa has been rewarded for his elegant experiments elucidating a basic question that has haunted immunologists and medical scientists ever since it came to be known that nature has endowed the human body with sophisticated defence mechanism to protect itself against the attack of disease-bearing germs. This defence is mediated through a type of protein molecule, called the antibody, that the body produces in response to the inimical pathogen. The antibody synthesis takes place in a specialised form of white blood cells, the B-lymphocytes. A peculiar property of the antibody which makes it so deadly effective is that it it tailor-made to fit the molecular identity card of the infectious micro-organism. This name tag is also usually a protein or a group of proteins known, in scientific parlance, as an antigen.

The fit between an antigen and its corresponding antibody is so extremely specific that it is considered anelogous to the relationship between a lock and its own unique key. That is why an antibody against one disease is of no consequence against another. Since the human body is exposed to a myriad diseases-causing microbes — bacteria, viruses and fungi — it is called upon to manufacture a large variety of antibodies each unique to counter the respective invader. In addition, the body also produces antibodies against almost all proteins, which it identifies as foreign, since the distinction between self and non-self is the principle on which an aggressor is recognised.

Current understanding of the molecular processes underlying the working of the human body, indeed all biological organisms, is that no substance can be produced by a cell in the body unless it possesses the necessary blueprint in its genetic repository. Since the body obviously produces a large repertoire of antibodies, it must possess the requisite genetic information. But this this load is so large that it was difficult to understand how the limited number of B-lymphocytes would be able to carry it. That was the conundrum that had defied resolution.

Dr. Tonegawa answered the question by demonstrating that, although the B-lymphocytes are able to generate an apparently limitless array of antibody molecules, they do not possess an infinite number of corresponding genes. On the contrary, they have relatively few antibody-genes, which then combine ingeniously to generate an astronomical number of unique permutations.

Dr. Tonegawa also discovered that B-lymphocytes possess this combinational capacity because their genes are arranged differently from those in the precursor cells in an embryo. These changes are brought about during the development and maturation of ths B-lymphocytes from its precursors. To prove this conclusively, he employed molecular engineering tricks. Thereby, he was able to produce true copies of the genetic material of mature B-lymphocytes, as well as the precursor cells. A one-to-one comparison helped pinpoint the precise rearrangement.

Dr. Susumu Tonegawa was born in Japan and had his education in that country. He is a graduate of Kyoto University. Currently, he is Professor of Biology at the renowned Massachusetts Institute of Technology in Boston, USA. However, most of the work for which he has received the award was carried out while he was at the Basel Institute of Immunology in Switzerland which has become the Mecca of immunologists in recent years.

This is the fifth Nobel Prize awarded in the field of immunology in the last 15 years, the others being given in 1972, 1976, 1982 and 1984. It is a reflection of the explosive development of this field over this period. It has come to dominate the bio-medical sciences, and particularly, research. The need to manufacture effective and safe vaccines to confer lifelong protection from deseases afflicting mankind is no doubt fuelling advances
the field. Simultaneously, man is s
ving for a better understanding of
natural mechanism by which the bo
protects itself. The Nobel Award is
recognition of this effort.

PVC INDUSTRY

There is at present a world short
of PVC, and international prices h
firmed up considerably, with supp
difficult to come by. The step-moth
ly attitude adopted towards the Ind
PVC industry all these years has c
strained its normal growth, with
result that the country continues to
dependent on imported material for
most one-third of its requireme
At times like this, the effects of
dependence are sorely felt. The G
ernment has proposed a minimum e
nomic capacity of 1,00,000 tonnes
annum for new PVC capacity, and
also directed that this capacity sho
be based on indigenous basic
material inputs. This insistence on s
is unrealistic in the Indian envir
ment, where size-related advanta
are more than offset by high cap
costs and infrastructural difficulti
Similarly, availability of basic raw r
terials — ethylene and chlorine,
only be from large Petro-chemical c
ckers and electrotake caustic sc
plants, and these take a long time
go from the drawing board to real
One therefore hopes that a well-th
ght out policy, which allows indig
ous PVC manufacturers to expand
stages, based on imported inputs
the short term, would be evolved. T
would be the most economic and lo
cal way to increase availability of P
in the country. These expanded ca
cities could, after a few years, char
over to locally available inputs wh
they are available from large pet
chemical capacities that are brou
on line. Simultaneously, a pol
should also be adopted to regul
the indiscriminate imports of PVC t
have acted as a retardant to the gro
th of the indigenous industry, at
same time ensuring that the indig
ous users get their full requireme
of materials. We along with the ot
manufacturers of PVC, have brou
these matters to the attention of
authorities concerned, and it is hop
that rational decisions would be tal
early.

— K. S. Naraya
(Chemicals and Plastics India)

Courtesy : The Indian P

COMPANY NOTES

Cyanamid India

Cyanamid India, proposes to invest s. 4.5 crores as a part of its four ear expansion plan. The proposal is ikely to get the green signal as soon s the company becomes a non-FERA ompany.

The parent Company, Cyanamid of JS, is voluntarily diluting its equity shareholding in the Indian company hrough a disinvestment of 4.08 lakh equity shares of Rs. 10 each at a premium of Rs. 20 per share.

In addition, the company is issuing 6.91 lakh shares on a rights basis to resident shareholders. The list which opened on October 1, closes on October 30.

With the dilution of the foreign equity holding, the company will attain a non-FERA status, thus enabling it to expand its pharmaceutical and agrochemicals product range and broadbase its activities, according to Mr. K.S. Bakshi, President of the company, while talking to newsmen.

Though the parent company is diluting its shares, the company would still continue to have an access to international technology, Mr. Bakshi said.

The company's expansion plans include expanding its product line to include speciality chemicals and surgical products, exploring the possibility of participating in the exportoriented ventures either from Madras or Noida, near Delhi.

Mr. Bakshi said that the company's performance for the current year was reasonably good. Despite the adverse drought conditions, he was confident that the sales would show a growth. The company expects a turnover of Rs. 42.50 crores in 1987 against Rs. 40 crores in 1986 an increase of six per cent. The pre-tax profit was likely to be about Rs. 165 lakhs, showing an increase of nine per cent over 1986. Mr. Bhakshi said.

The company results would have been better but for the regulatory constraints on pricing of pharmaceutical products and delayed implementation of the new drug policy, according to Mr. Bakshi.

Mr. Bakshi explained that the new drug policy, if implemented in the same spirit as it was drafted, would have a favourable impact on the industry.

As regards the Supreme Court case, he said that the Supreme Court in April this year dismissed the writ petition granted to the company by the Delhi High Court in 1984. The Supreme Court also directed the Government to grant the company hearings in respect of the pending price review applications for its bulk drug Demeclocycline (DMCTC) and its formulation of Ledemycin and Hetrazan.

Till today, he added, the company had only been given an opportunity to make its submissions with respect to the fixation of prices for its bulk drug DMCTC in 1981. No hearing had been granted with respect to the price of formulations and bulk drugs.

Mr. Bakshi pointed out that in the last few weeks the Government had set up a committee to investigate the amounts due for collection under the DPEA (Drug Price Equalisation Account) from the various companies involved. The company believed that the issue of payments into the DPEA could not be fairly addressed till all its pending price review applications had been dealt with. The company made representations to this effect to the concerned Ministers and the Secretary of Chemicals. Mr. Bakshi hopes that the Government would be fair and equitable in handling this matter as they had been in other DEPA cases in the past.

The President pointed out that with the constraints in drug prices and FERA being resolved, the company had now a clear direction and had firmed up exciting plans for the next five years. Sales were targeted for an annualised growth of 20 per cent up from the previous trend of around 12 per cent. The objective for pre-tax profit was nine per cent against the current four per cent. Collectively this should result in a doubling of post-tax return on equity during the next four years. These targets would be achieved by growth in the existing core business and entry into a few allied fields.

In his view, key contributions would come from agricultural products where sales were targeted to grow faster than the market. Since this division was financially strong, the launcing of new products would be immediate.

First on schedule was 'Stomp', the broad-spectrum herbicide. This product has already met with a significant success around the world. This would be followed by 'Abat' ISG, the safe larvicide and a broad spectrum foliar insecticide based on acquired technology, Mr. Bakshi said.

VAM ORGANICS

Vam Organic Chemicals, a nine-year old company set up in technical collaboration with the AB Bofors of Sweden, has reported encouraging performance for the year ended April 1987.

Production of vinyl accetate monomer (VAM) and its intermediaries acetaldehyde, acetic acid and acetic anhydride rose to 46,588 tonnes during the year from 40,499 tonnes produced in the previous year, reflecting a rise of over 15 per cent. This was due to the easy availability of molasses, the chief raw material used for producing alcohol. The company could procure 68,318 tonnes in the current year as against 36,780 tonnes of molasses last year, thereby reducing the purchase of alcohol from the open market to 10.286 tonnes from 10,707 tonnes. Net sales at Rs. 24.27 crore rose by 17 per cent over 1985-86 and more than 50 per cent over 1984-85.

Despite the increase in production and sales, the profit margin continued to remain under pressure. In fact, gross profit in relation to net sales has declined to 37.4 per cent from 38.1 per cent in 1985-86 and 42.4 per cent in 1984-85. This is due to the significant rise in expenses. Expenses as a proportion of net sales have gone up to 63.7 per cent from 62.3 per cent in 1985-86 and 60.4 per cent in 1984-85. Power and fuel bill alone accounted for a rise of nearly Rs. 1.30

crore at Rs. 4.80 crore. Salary bill was also higher at Rs. 96.27 lakh against Rs. 85.39 lakh. The rise of Rs. 33 lakh in interest burden was largely due to the increase in fixed deposits from Rs. 1.38 crore to Rs. 2.19 crore.

From the grossprofit of Rs. 9.09 crore (previous year Rs. 7.86 crore), a substantially higher amount of Rs. 4.82 crore has been set aside for depreciation against Rs. 1.77 crore. This is due to the company having claimed 100 per cent depreciation in respect of a biogas plant set up at a cost of about Rs. 2 crore commissioned during the year. The plant, which is based on technology furnished by BIOTIM of Belgium, can recover energy rich methane from distillery effluents which will help in reducing fuel costs. The enhanced prescribed rates of depreciation on plant and machinery has also resulted in an increase of Rs. 91.55 lakh under this head.

After providing Rs. 66 lakh for taxation against Rs. 72 lakh, the profit after taxation and depreciation is lower at Rs. 4.10 crores compared to Rs. 5.37 crore. The net profit in relation to net worth thus works out to 24.0 per cent only, which is far lower than 38.4 per cent in 1985-86 and 56.7 per cent in 1984-85. No provision for investment allowance has been made; Rs. 19 lakh had been provided in the previous year. The amount of Rs. 5.70 crore brought forward from the previous year has helped in raising the disposable profit to Rs. 9.74 crore from Rs. 6.98 crore.

Enthused by the encouraging performance, the directors have stepped up the dividend to 25 per cent, as against 20 per cent distributed in 1985-86 and 15 per cent in 1984-85. The balance of Rs. 8.48 crore has been retained in the accounts.

The reserves of the company stand at a comfortable position of Rs. 11.72 crore as against the share capital of Rs. 5.55 crore. The increase of Rs. one crore in share capital is on account of the financial institutions having exercised their right to convert a part of their term loans into equity at par.

Vam Investment and Vam Leasing, two of the wholly owned subsidiaries of Vam Organics, have incurred marginal losses. The two companies together hold 3.03 lakh shares of Ramganga Fertilisers, a company under the same management.

The expansion and diversification plant of Vam Organic includes the expansion of its production capacity by 25 per cent by modifying its existing plant. The increased capacity would be operative from the end of the first quarter of 1988. The company also plans to double its capacity of vinyl accetate monomer to 20,000 tonnes per annum.

Meanwhile, work on the Rs. 80.75-crore monoethylene glycol (MEG) project at Nainital in UP is going ahead at a rapid pace. India Glycols Limited, the company formed for this project, will be manufacturing MEG, an insubstitutable raw material used in the manufacture of polyester filament yarn, polyester staple fibre and polyester films.

Besides this, the company also proposes to set up production facilities for ethylene vinylacetate copolymer and poly vinyl alcohol which are the down stream products of VAM. It also plans to recover carbon dioxide generated in the fermenters of the company's distillery. The company has secured rights from BIOTIM of Belgium to market the technology for setting up biogas plants.

LEYBOLD AG — A DEGUSSA-OWNED COMPANY

From the 1st of October 1987, the Leybold-Heraeus GmbH who emerged in 1967 from the amalgamation of E. Leybold's Nachfolger and Heraeus Hochvakuum, with Degussa AG, W.C. Heraeus GmbH and Metallgesellschaft AG as shareholders, after twenty years of booming growth became a wholly owned enterprise of Degussa.

Because of the withdrawal of W.C. Heraeus GmbH, the name of the company changed from Leybold-Heraeus GmbH to Leybold Aktiengesellschaft.

The company headquarters moved from Cologne to Hanau where the vicinity to the head office of Degussa in Frankfurt will simplify cooperation. The central management's registered office is thus located in Hanau. It the declared goal of Degussa to fos the future development of Leybold A as an independent enterprise and assist in consolidating and advanci Leybold's leadership position in t field of vacuum technology.

Degussa acquires in Leybold a hig tech-company boasting above-avera growth rates in highly demanding a innovative technicals fields. Additio ally, there will ensue manifold oppo tunities of cooperation in the metallu gical sector.

At the same time, Leybold will I gaining access to technological field such as special metals, chemistry ar biotechnology.

Mr. R. PANKAJ PATEL

Mr. R. Pankaj Patel, executive d rector of Cadila Laboratories, has bee elected as member of the committe of administration panel-1, Drugs an Pharmaceuticals of Basic Chemicals Pharmaceuticals and Cosmetics Expo Promotion Council (CHEMEXCIL) fo the year 1987-88.

CALL TO USE PESTICIDES CAREFULLY

The minister of state for chemical and petrochemicals, Mr. Jaichandra Singh, called for a judicious use o pesticides, proper water and fertilise management and adoption of suitabl agronomics practices for plant protection.

The minister was inaugurating a five-week international training prog ramme organised by the Hindustan Insecticides Limited (HIL) and co-sponsored by the World Bank, FAO, UNDP and Unido. The minister warned that though chemicals were essential for agriculture production, farmers had to be vigilant about their possible hazards Thus, modern techniques had to be adopted to check pullution and maintenance of the environment. Mr. Shyam L. Ghosh, joint secretary in the department said that the government was considering giving more teeth to the Environment (Protection) Act and Prevention of the Food Adulteration Act to ensure proper use of chemicals.

Ten countries from Asia and the Pacific including China, India, Inlonesia, Korea, Pakistan, Sri Lanka, Philippines and Thailand are participating in the conference

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Highlights in Chemical Technology (Part-2)

A CENTRE FOR EXCELLENCE IN CEMENT COMPOSITE MATERIALS MAKES A DEBUT IN U.S.A.

A centre of Excellence in Cement Composite Materials has been decided upon at the University of Illinois,Urbana-Champaign, with a grant from the Air Force in USA.

The overall objective of the new Centre is to develop a multidisciplinary effort to explore the potential for developing new materials based on cementicious matrices. Research project will concentrate in several areas as under:

(a) The optimization of properties through control of composition;
(b) Microstructure and processing;
(c) Creation of ductile materials by fibre reinforcement;
(d) Development of new cement chemistries;
(e) And synthesis of novel cement polymer composites.

Participating in the Centre are 14 faculty members representing the departments of chemistry, chemical engineering, metallurgy and mining, mechanical engineering, geology and theoretical and applied mechanics. The grant will supply $1.12 million for the first two years and $650,000 for the third year. (*C & EN* 3/30/87 p. 18).

ALUMINIUM BATTERIES COME INTO LIMELIGHT IN USA

Aluminium batteries is coming into limelight at least in the USA. Alupower of Bernardsville, New Jersey is already marketing an emergency lighting system based on aluminium batteries (Al-B). Another company Voltek has also demonstrated a three wheel, one-person car powered by refuellable aluminium batteries.

The major appeal of aluminium batteries is an energy density 2 to 5-times that of conventional types (*New Scientist* 12, July 1986, p. 34). Their energy comes from the reaction of aluminium metal with oxygen. One electrode is aluminium metal, while the other is porous to admit air. Aluminium air batteries can be made disposable or refuellable by the addition of fresh aluminium metal and electrolyte. Disposable Al-Bs would be of the same size and voltage as the common zinc-manganese dioxide batteries (dry cell) and alkaline types used in flashlights, toys and electronic equipments.

Alupower Reserve Light Series is a dry aluminium air battery which can be stored for long periods until it is needed, for example, to provide backup power. The user activates the battery by adding a salt-water mixture. The battery's advantage is that it can supply a steady low voltage for many hours.

A package measuring about 5 x 5 x 10 cms can supply 1 amphere at 2.2 volts for 24 hours. A larger version can operate for 240 hours, an unusually long time for backup power. Although the power levels are modest, they are fine for powering electronic equipment, such as computers or radios.

Similar batteries can be activated by sea water. These batteries have attracted attention from the military. The company is also developing small batteries that operate in sea-water to illuminate fishing lures

Aluminium batteries would c more than conventional zinc batt ies and perhaps more than alka types, but they could provide m energy. The success of alkaline b teries has shown that people will a premium for batteries with m energy capacity. Disposable alum ium batteries should pose no en ronmental problem. In fact, th could have important advantag Conventional alkaline batteries g off hydrogen and battery makers a mercury compounds to absorb t hydrogen to prevent excess pro sure from causing leaks of the cau tic electrolyte. The mercury co pose waste disposal problem.

Refuellable aluminium batteri might pose a waste disposal pro lem -- the aluminium hydroxide ele trolytic remaining after the metal h been consumed. (*New Sci. 7/23/ p. 27)*.

ACTIVE CARBON-BASED THREAD-LIKE ADSORBENT DEVELOPED BY KOHJIN CO. JAPAN

Kohjin Co., Japan has recent developed a thread-like adsorbe based on specially processed activ carbon. The company is now lookin for partners to develop end produc from the material. The new adso bent has various advantageou properties from adsorbing power non-inflammability, easy processib ity and water-holding ability. Thes properties can be useful in develo ing new end-products.

The thread-like adsorbent offe the following salient advantages:

- Excellent long-lasting ability to adsorb bad odours;
- Excellent processibility into paper, non-woven fabrics and molded products;
- Non-inflammability and excellent water-holding, moisture-absorbing and gas-permeation abilities;
- Selective adsorbing ability can be adjusted by changing the processing conditions, and
- Mass production is possible as well as easy decomposition after use.

he company expects that main s will be in the fields of fibrous dorants, adsorbents for various stances, gas-proof materials, m preventing material; material keeping foods fresh. (*Japan em. Wk.* 7/30/87 p. 4).

PAN FORESEES GOOD OSPECTS FOR SILICA OR ANIUM-BASED MULTI- MPONENT ULTRAFINE MPOSITE PARTICLES

he Ministry of International Trade ndustry (MITI) has selected the duction technology for silica or nium-based multicomponent afine composite particles (raw terial for ceramics) as a theme for perative effort by the official or vate sector in Japan).

he planned research will be con- cted from fiscal 1987 through 39 by two Government laborator- , namely Government Industrial velopment Institute and Govern- nt Industrial Research Institute. In dition, five private businesses luding Denki Kagaku Kogyo, achi and Sumitomo Chemical will o participate. These institutes and mpanies will endeavour to pion- the technology through com- ed use of leading edge hnology involving carbonic acid gas laser beams, high frequency plasma, ion-mixing and vapour phase reaction. They will also aim at developing technology for processing and practical utilization of the target particles.

In connection with the planned research, the two Government laboratories have hitherto promoted research aimed at extracting silicon from rice hulls and using it as ceramic material. (*Japan Chem. Wk.* 7/30/87 p. 1).

COLD-SETTING ELECTRO-DEPOSITION PAINT DEVELOPED BY KANSAI PAINT, JAPAN

The door is now open for a easy painting of thick non plates thanks to Kansai Paint's first success in the field of anionic electro deposition paint. The new electrodeposition paint (trade name ASCA ED) hardens at room temperature. It allows the efficient coating of composite metal parts that are partially made of rubber or resin. Rubbers and resins are prone to disfiguration when exposed to high heat. It will also allow hard-to-heat cast iron and thick iron and steel plates to be coated easily.

The new paint is being touted as the latest and most practical material for electro-deposition coating of composite metal parts of cars and construction materials and for thick steel and iron plates found in industrial machines. The great selling point of electrodeposition paint is the way its electrical application conveniently forms a uniform anti-corrosive film on the inner surfaces of tanks and in narrow places hard to get at. The great drawback of this process until now has been that the part or piece had to be heated to 150°C to 200°C. to fill in gaps in the coating and to harden it completely. Naturally this makes it difficult to apply this paint onto composite metal parts that have rubber or synthetic resin pieces and onto parts made of cast iron or metal plate that can require up to two hours of continuous heating.

Kansai Paint's breakthrough in the field of anionic electrodeposition paint came after the development of a special synthetic resin. This resin which has already been patented is the result of Kansai Paint's proprietery techniques for the copolymerization of an acrylic monomer that has both a fatty acid and other acrylic resins in it. The fatty acid polymerizes while oxidizing. The film of the paint hardens in about three hours and is between 30 and 35 microns thick. A much more uniform paint film can be formed by this technique than that formed by the conventional techniques for dipping or spraying the paint.

This electrodeposition coating can be painted with advantage on composite auto parts containing rubber or synthetic resins, low voltage electric parts, plastic parts that have metallic covers, and engine blocks of industrial machines. The Company expects sales of over 0.9 billion yens for this novel paint by 1988. (*Japan Chem. Wk.* 7/30/87 pp 3-4).

UNPLASTICIZED P.V.C. DEVELOPED BY SEKISUI COMPANY OF JAPAN

Sekisui Company of Japan has diversified its polymer technology by developing unplasticized PVC not containing any plasticizers. The presence of plasticizers in PVC has been the major obstacle to the use of PVC as a basic material in medical products.

The unplasticized PVC will be marketed under the trade name Esmedica V as the basic material for medical equipment and instruments. The Company has registered an application with FDA (USA) for

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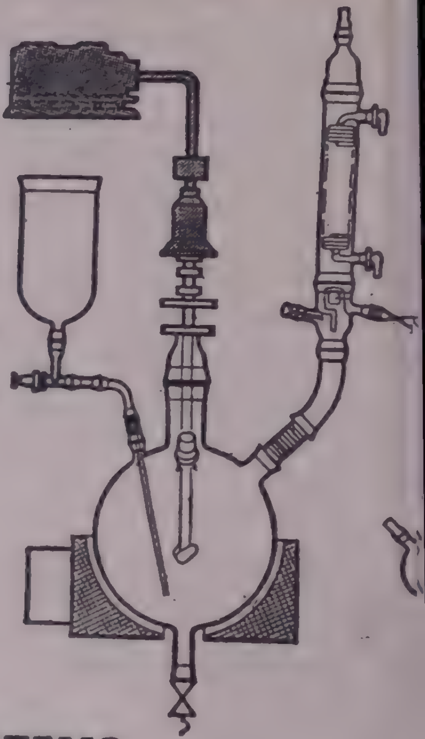

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approval of Esmedica V as a basic material for use in medical equipment and instrumentation. (*Japan Chem. Wk.* 7/30/87 p. 4).

WATER-SOLUBLE CONDUCTING POLYMERS UNVEILED

Researchers at the University of California (Santa Barbara, USA) have reported success in preparing self-doped conducting polymers that are soluble in water in the doped and undoped states. The polymers are sodium poly (3-thiophene-alkanesulfonates) in which the sulfonyl group is linked to the thiophene via a two -- or four carbon chain. The researchers have shown for the first time that partial oxidation of these polymers carries self-doping --that is, 'as you remove an electron from the polymer's pi backbone (creating a delocalized cation), you kick out a proton from the sulfonic acid,' explains researchers 'what you end up with as a polymer, in which the counterion $[SO_3]^-$ is covalently bonded to the positively charged backbone.'

Such polymers have potential as ion-exchangers. In addition they are electrochromic. (They change colours with electric potential) although the California researchers have not yet thoroughly investigated this property. Because the polymers are water-soluble, they can be processed without organic solvents. (*J. Am. Chem. Soc.* **109**, 1858 (1987)) (*C & EN* 3/23/87 p. 20).

A DEMONSTRATION PLANT FOR GUAYULE SLATED

Engineering has begun on a 150 ton per year demonstration plant to extract natural rubber from the guayule shrub. Engineering and construction of the plant is being carried out by Dravo Engineering under a contract awarded by Firestone Tyre & Rubber.

The project supported by USDA and the Department of Defence, is intended to spur development of a domestic natural rubber industry. To be located at the Gila River, Indian Community, just south of Phoenix in Sacaton, Arizona, the plant will employ proprietary process technology developed at Firestone's Central Research Laboratory. Construction has already begun last March. (*C & EN 2/9/87 p. 22).*

AN IMPROVED PLASMA TORCH USING HELIUM DEVELOPED FOR ATOMIC SPECTROMETRY

An improved inductively coupled plasma (ICP) torch using helium has been developed by chemistry professor Akbar Montaser and his associates of George Washington University, Washington D.C. It is being patented and offered to industry by Research Corporation, Tueson, Arizona. The torch applicable to Atomic and Mass Spectrometry as a way to excite and ionize atoms, overcomes certain limitations of widely used argon units. The latter cannot excite or ionize elements having ionization energies approaching or higher than that of argon. Helium has the highest ionization energy of all the elements. In the new torch, helium is generated directly in one simple step, and the torch operates effectively without the addition of external cooling air. The firm reports that because of the torch's design, helium consumption is only 8 lits per minute, one seventh that of earlier helium devices. (*C & EN* 2/9/87 p. 22).

JAPAN REVIVES OLD DEACON PROCESS BY MODIFICATION

Mitsui Toatsu Chemicals (MTC) of Japan has begun construction of a $10.4 million plant to produce 30,000 tonnes/year of chlorine from hydrochloric acid at Omuta, Kyushu Island works. Completion is stated by July 1987. The modified vers of the century old Deacon proc (dubbed 'MT Chlor') uses chromium-based proprietary catal in a gas phase, fluidised-bed re tion. The design was confirmed i 1 tonne/day demonstration plan

The plant will use hydrochlo acid produced at MTC's 25,000 to nes/year toluene diisocyanate (T plant as raw material. The proce is available for licensing.

An advantage of the route, is th it does not require expensive equ ment because of the relatively lo reaction temperature of 400° Chlorine is produced at a purity of 99.5%. MTC believes that this pr cess can find use wherever electri ity costs are too high to perm chlorine production by electroly routes. (*Chem. Wk.* 6/24/87 p. 18

ADVANCE IN CLEAN COAL TECHNOLOGY

Electricity generation has com menced at the retrofitted 100 mega watt Nucla power station nea Denver, USA. The generating sta tion is billed by the Colorado-Ut Electric Association as the world first utility-scale plant using the ci culating fluidised-bed (CFB) com bustion clean coal technology.

The 27 year old Nucla station formerly a conventional 36-MW coal-fired station, has been out-of service since mid-1984 for retrofittin and upgrading. Kurt Yeager, Vice President of the Electric Powe Research Institute, calls the station "a pivotal project for the utility industry. (*Chem. Wk.* 6/24/87 p. 18).

AMARAVATHI CHEMICALS TO COMMENCE PRODUCTION OF SORBITOL FROM TAPIOCA STARCH

India's first sorbitol plant usin

oca starch as the feedstock is to nmence production at the end of 7. So far sorbitol has been pro- ed using dextrose as feedstock. nmercial production at Amarava- Chemicals' Rs. 54 million ($4.2 ion) sorbitol plant at T.N. Pala- , near Pondicherry will use the aper feedstock tapioca starch, n annual capacity of 3,300 tons.

urrent demand in India for sor- l is estimated at around 26,000 /year and is expected to rise to 000 ton per annum by 1989/90. bitol apart from being the starting material for Vit C (ascorbic acid) sed extensively in pharmaceuti- tobacco, surfactant and food ustry. (*ECN* 6/15/87 p. 22).

ORKING WITH ASBESTOS' -- INFORMATIVE BOOKLET LEASED BY NATIONAL FETY COUNCIL USA

he National Safety Council, USA, non-profit organization has ently released a free booklet on bestos under title 'Working With bestos'. This 18-page document iews ways to reduce exposure, scribes respirators and other pro- tive gear, and offers advice on bestos disposal and emergency clean-up.

It also documents asbestos-based diseases, how exposure occurs and steps to take before entering and leaving work areas. -- Copies are available from National Safety Council, 444, North Michigan Avenue, Chicago, Ill. U.S.A.

A NEW SUPERIOR RAVEN-BLACK DISPERSE DYE FOR POLYESTER FIBRE DEVELOPED BY NIPPON KAYAKU

Nippon Kayaku Co. of Japan has developed a raven-black disperse dye (trade name: Kayalon Polyester Black FM-SF Paste 100) for polyester fibre. The dye's apparent colour does not vary with light source. Its main features are: (a) it shows deep black colour, superior to conventional dyes (b) excellent build-up and adsorption properties, which ensure deep dyeing, (c) less dependence on temperature and superb level-dyeing properties, and (d) less contamination of cellulose fibre and suitability for mixed fabrics.

The company is contemplating applying the new dye to the dyeing of ordinary formal wear and high-grade casual wear by capitalizing on the current 'monotone colour boom' in the fashion industry. (*Japan Chem. Wk.* 8/6/87 p. 5).

FOOD PRESERVING GELATINIZERS DEVELOPED FROM SODIUM ALGINATE

Kibun Food Chemical Co. of Japan has unveiled recently various types of gelatinizers containing sodium alginate. They serve to preserve food for a long time and will be supplied to the food industry. (*Japan Chem. Wk.* 8/6/87).

FLUOROELASTOMERS FOR SOPHISTICATED APPLICATIONS

The Fluorel types FC-2122 and FC-2123 are vinylidine fluoride and hexafluoropropylene copolymers with a fluorine content of 65% and an integral bisphenolic crosslinking system. Both products have been developed for the injection moulding of elastomer articles with complex geometric dimensions. The Fluorel type FC-2121 is a low viscosity copolymer with a very low permanent set, which makes it particularly suitable for the injection moulding of O-rings.

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Methanol from Low Grade Coal - A superior Auto Fuel*

DONALD F. OTHMER
Polytechnic University, Brooklyn, N.Y. 11201

CKGROUND AND SUMMARY

umps and falls in oil prices have devastated world econ-
nies and made the world's richest nation its largest debtor,
epeat the lurid fantasies of other Arabian nights. Other fuels
n oil must be found. Expensive and exhaustive search has
nd no hydrocarbon which is economical in America -- only
thanol for automobile fuel has been found possible -- from
ural gas or coal.

During the early 1970's I was invited to address five or six
he technical conferences of the Arab OPEC. At one at Abu
abi, I told the Arabs that every advance of a dollar a barrel
oil prices indeed will make some new energy source com-
titive. At $3 per barrel, no competition; certainly strong com-
tition at $25 to $30 from methanol, and that without adding
 large fringe costs which always must be added to the base
ce of imported oil.

Sheik Yamani, Oil Minister of Saudi, agreed: "If we force
 West to find alternative energy sources, they will." Another
PEC executive confessed that "OPEC customers can move
ich faster toward finding alternatives to oil than Arab
ates can get away from their present total dependence on
."

Unfortunately we have not "moved faster" in any **positive**
ection -- but our whole economy has danced faster and
er more recklessly to the tune of OPEC prices -- now low,
w high, now low! King Fahd of Saudi exulted in his boast
rab oil was lucky, because all of the alternatives (gasoline
m coal processes) discovered proved impractical", and the
ions of dollars spent in trying to make gasoline from solid
els has been wasted. No hydrocarbon automobile fuel has
en found to be economic in this country.

Saudi's King Fahd has also commented "any large amount
production of oil so as to flood the market is not important
 long as (Saudi's) national income is preserved."
ersely, of course, sale of oil by the Arabs at the highest pos-
le price -- the greatest possible oil squeeze on our econ-
y -- was "not important" to the King as it would secure the
me end, i.e. insure Saudi's large income and the King's plea-
e, while devastating world economy.

Unfortunately the question is not **whether** OPEC will get its act together again from its present disarray so as to boost oil to the $100 a barrel level which some OPEC members have announced as policy -- it is **When** do prices go up to several times the present level. Five years ago, before the present quarrels in the OPEC, prices were predicted -- by those who predict well -- to be $60 a barrel by the early 1990's.

But we will be "over a barrel" if the U.S. is paying overseas (how and with what?) $60 to $100 a barrel for oil at the same time as we are paying at home the billions required for plants to make anything from coal in the tremendous quantities required for a transportation fuel. Nothing of our magnificient achievements during World War II in conversions of vast amounts of raw materials, previously unused for making some essential final products, e.g. rubber, penicillin, nuclear fusion, would be of any size by comparison to such a program. And the financing -- from where? -- would make our present national debt, already the largest of any country, look like peanuts. (i.e. insignificant).

However, the major problem would be that of our Joint Chiefs of Staff in trying to fight without liquid fuel a possible war, which itself might be brought on by the oil problem. Meanwhile chemical engineers would be trying frantically to build synthetic fuel plants, and petroleum engineers would be experimenting with tertiary and even quarternary methods of sucking oil from the ground and would be blasting out the caps of low production oil wells which by now have been sealed.

Methanol synthesized from coal is the only liquid which has been produced and sold as synfuel in this country -- and quite profitably -- and this with 100% private capital. All of the technology for design of methanol plants is available; and the technology, conditions, and specific sites for at least a half dozen major plants for its production have been established.

Methanol is now made principally from natural gas; however, coal which cannot be sold because of high sulfur, ash, or combined water, can give synthesis gas in many places, then methanol for about 50cent/gallon. The American (Wentworth) process -- long used in the world's largest unit of 2,500 tons per day -- now uses three catalysts in series to give higher yields and lower plant and operating costs. Unrefined methanol made from one ton of quite unsaleable coal drives a car more miles, with greater power, with negligible pollution, and more smoothly (no engine knock) than will the gasoline distilled from one ton of expensive oil from far away.

A 7 year, 20 million mile operation, with hundreds of cars,

A Plenary Lecture:- CHISA International Congress of Chemi-
cal Engineering Prague, Czechoslovakia - August 31, 1987.

American Industrial Units are used, also American Dollars and
nts.

has shown methanol to be 50% more efficient than gasoline. Single auto engines have given over 90% higher efficiency in other tests. Engines give minimal pollution and run cooler. They can be smaller and lighter, and will not require the clumsy water system necessary to remove the heat wasted by gasoline. Their exhausts have no health hazards of lead, or of cancer causing aromatics used to improve octane. High performance racing cars have long used methanol because of its efficiency and safety in use; making possible lighter, more efficient, longer lasting engines.

Since methanol has only one-half the heat of combustion of gasoline, a 10% blend has only 95% that of gasoline. A dozen cars of various makes have gone a million miles comparing the blend against gasoline -- mileage averaged about 3% higher, some cars 15% better, than with straight gasoline and with antiknock properties of leaded gasoline. Engine and car life has been increased by 10% when using a methanol blend, or by 25% when using methanol alone -- both compared to gasoline.

The petroleum industry was developed in America with its methods of exploration and production, also of refining into fractions for use as fuels and lubricants. However, I do remember well, when we were guests of the first CHISA Congress in Brno just 25 years ago, I visited the plant and the manager of the great Czechoslovakian builder of chemical plant equipment in Brno. He did not know that, at the turn of this century, his company had supplied some of the equipment for a petroleum refinery which a man named Rockefeller was then building on the south shore of Lake Michigan not far from Chicago. Earlier his company had built equipment for the earlier Romanian oil industry.

Now our 160 million motor vehicles and our airplanes, trains, boats, giving transportation; also our stationary engines and boilers demand more fuel than we can supply. Thus the U.S. spends **over one hundred million dollars each day** on gasoline from imported oil. Unfortunately others obtained a monopoly on the world's oil and increased the price of crude over a dozen times; then it dropped well below its high, as supply exeeded demand.

Now it again is rising to what will be another dangerous high. However, a Government study tells us that **domestic oil production** will continue to decline; due to the elimination of high cost domestic petroleum by imported oil at a low cost resulting from the internal quarrels of OPEC. The country, by the 1990's when domestic reserves are able to supply only **about 20 more years** requirements at present rates of consumption, will have come to depend to a larger and larger extent on imported oil. Its price then probably will be double the present price of $18 a barrel.

These analysts add that the recent American programs to make **hydrocarbon synfuels,** which have wasted billions of dollars and a decade of precious time in trying to solve the energy problem, will have no major role in reducing our subservience to foreign oil. On the other hand, the world's richest reserves of solid fossil fuels, coal or lignite, are just bene our feet in many places. Sometimes, within two or three me of the surface, there are seams as thick as six or more met representing the accumulation and storage of solar energy a million years, equal to energy reserves many times tha all of OPEC's oil. These will supply solid fossil fuel long a the world's available oil is gone.

PRODUCTION OF SYNGAS FROM COAL

Methanol, an excellent fuel for internal combustion engi -- spark, diesel, or turbine -- can be made from syngas com from any carbonaceous material. Syngas is made by refo ing natural gas or by partial oxidation of coal solids in presence of water, as steam. Some 65-70 per cent of the h ing value of natural gas may be retained in the product, m anol, and this conversion will yield by the Wentworth American process, as much as 50 per cent of the heat of poorest solid fuels up to 60 per cent for the b coals.

Gray recommends methanol as the preferred liquid fue be made from syngas from coal(1). Many others do so a including Exxon's David, who says it is **"the lowest cost liq fuel available from coal."** also when used in automob it has "fewer emission problems."(2). And Exxon knows si it has spent probably hundreds of millions of dollars -- m from taxpayers -- in attempting unsuccessfully to develop economical **hydrocarbon** synfuel from coal.

Large reserves are available in many places of low va coal and lignite in the desirable price range of $0.60 to $1 per million Btu, which will supply a plant for 25 years more(3). The fuel is otherwise unsaleable because of dista from market and/or poor quality. It may be at or near the s face, with high contents of chemically combined water, sul and/or ash. These will yield fuel methanol in 1987 dollars an average cost of $7.50 per million Btu, $150 per ton or cent per gallon.

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Another large installation separates air to give about a per minute of oxygen for each thousand tons per day of me anol, European processes require even more oxygen to s thesize also the 12 to 20% of water coming with the fi methanol in their converters. Also required is hydrogen, wh must be produced expensively by the fuel, and then waste water whcih must be separated, again expensively, from final product. In the separation of air to give so much gen, a large amount of argon also may be separated. This be the most valuable by-product, and it amounts to about % by weight of the oxygen separated.

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Condensate leaving the condenser following the reactor con- s about 97% methanol, not more than 1% water, and ~2% her alcohols. Used directly as a fuel for cars, it is better than pure methanol and saves the considerable equipment and heat always used in the refining of product.

This 1% water, usually less, is produced from hydrogen, expensively formed by the coal, and the oxygen, expensively separated from the air. This contrasts markedly with the 10 to 20% water synthesized by other catalytic methods as a costly by-product, then to be removed by several steps of distilling.

The heat of reaction in each of the catalyst beds builds up successively, rather than being wasted by intercooling as in the classic methanol loop, so the gas stream discharges from the converter at a much higher temperature to allow much higher heat recovery. With the near elimination of formation of by-product water and other features (4,5), the thermal efficiency is so improved that other processes require over 5% more coal to be mined and delivered to the plant as feedstock (energy) per ton of methanol product. Plants using these European processes also cost some 20% more, according to analyses by European engineers familiar with both systems.

One lignite has a high content of chemically combined water (35%), and requires only this combined water to supply all of the water requirements of the entire plant. Additionally, a significant amount would be recovered for delivery to the surrounding arid community, where it could be most appreciated. In general, new process design makes possible the use of very little water, never more than the volume of the product methanol. This compares with the very large water requirements of other methanol processes and of every hydrocarbon synfuels process and plant.

METHANOL AS A FUEL IN AUTOMOBILES

Methanol was used in the first autos and has long been known to be their most efficient and cheapest fuel. The Ethyl Corporation for 60 years has been improving the performance of gasoline in cars but recognizes methanol as being an excellent fuel instead of gasoline(6). It is also an excellent fuel for diesels and gas turbines. For generations methanol has been preferred for racing cars because of unsurpassed efficiency, greater power, low fire hazard, high octane rating, minimum pollution. Also it increases greatly the life of these over worked, very expensive engines, and is the only fuel used in major races, where fuel cost is no consideration; e.g. the big Indianopolis 500 mile race, used exclusively for years.

Automobile engines have been designed for over a century by thousands of engineers at a cost of billions of dollars in optimizing the auto-gasoline combination. Thus the highest performance which may be expected by gasoline has already been obtained in the present auto, although even better performance is readily obtained with methanol in cars designed to use gasoline.

On the fuel side, refiners have spent recently billions of dollars for equipment to improve gasoline's octane rating, eventhough this wastes 5% of its energy; and they say this adds has shown methanol to be 50% more efficient than gasoline. Single auto engines have given over 90% higher efficiency in other tests. Engines give minimal pollution and run cooler. They can be smaller and lighter, and will not require the clumsy water system necessary to remove the heat wasted by gasoline. Their exhausts have no health hazards of lead, or of cancer causing aromatics used to improve octane. High performance racing cars have long used methanol because of its efficiency and safety in use; making possible lighter, more efficient, longer lasting engines.

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On the fuel side, refiners have spent recently billions of dollars for equipment to improve gasoline's octane rating, eventhough this wastes 5% of its energy; and they say this adds probably 5 cents a gallon to its cost, 12-16 cents at the pump. The oil's capacity to produce gasoline is used partly to produce benzene, also toluene and xylene (BTX) to improve the octane number. Benzene causes the dread cancer, leukaemia, and other diseases, the other aromatics are partially converted to benzene. This may make BTX more hazardous for general usage than the lead they replace.

Almost $4,500 millions is spent by the American auto industry each year for R & D - more than by any other industry(7). This research is expected to develop the "average vehicle of the 1990's which, Ford says, will perform "in excess of 100 miles per gallon of gaoline (43km/l)" Nowhere, however, in this tremendous research fund is there anything to develop what necessarily **must be a better fuel with lower cost than today's gasoline,** and particularly that of the 1990's, when gasoline will cost very much more.

Even after years of such expensive research, Ford and General Motors cannot produce cars to give the average legal minimum miles per gallon of gasoline(8), they could have been fined for this offense a total of $700 million in 1985. (Jaguar, an expensive but very inefficient British car did pay many millions of dollars in fines, some $212 for each 1983 and 1984 car sold in the U.S.).

Methanol as a fuel gives big savings. Particularly these are apparaciated by operators of large fleets of cars. Thus to service a thousand branches throughout California, the Bank of America operates some 2,500 cars. Due to disruptions during the 1970's of the supply of gasoline, thus of communications and of all operations, it searched for domestic motor fuel that would be available **always** and **dependably.** It began an extensive and long time program to compare gasoline and methanol. This has now logged over 20 million miles.

This program has shown (9,10) that methanol:-

- Is a cheaper fuel in miles per dollar and is much more efficient in the auto engine.
- Increases significantly the life of the engine, which during its life has about the same cost of maintenance.
- Greatly decreases or practically eliminates exhaust pollution.
- Increases horsepower and drivability of every car with which it has been used. (or smaller, lighter engine for same horsepower).
- Can be used in blends in standard cars, without change, as the most economical way to eliminate knock.
- In blends, even as low as 5% it has increased mileage in some cars.
- In 10% blends, with only 95% of the thermal energy of gasoline, it gives at least the same average mileage as gasoline (some recent model cars give better mileage), and gives anti-knock properties equivalent to leaded gasoline.
- Can be used neat in present gasoline cars when parts in contact with liquid methanol are modified at a c of a few hundred dollars per car. Inexpensive additi are used in such small amounts in both fuel and l ricants that there is no siginificant added cost to the fu
- Can be used neat in modified cars, built on assem line at no greater cost than gasoline cars. Again ac tives are used without significant added cost.
- Reduces greatly the temperature of combustion, her of the engine.
- Allows a smaller, less expensive, engine system.
- Will allow the design of an entirely new methanol to be built around such a cool running engine, which be lighter, cost less, and not have the clumsy water ra ator and cooling system necessary to discard the la heat wasted in burning gasoline.

The results of the work -- probably the most extensive e on any fuel -- have been published in comprehensive repo available to the public (9,10).

To understand how these advantages are possible, the ferences in the properties of methanol and of gasoline m be considered. With one half methanol's weight being oxyg its further oxidation gives only about one half as much h as the combustion of the carbon and hydrogen compris gasoline. Petroleum chemists, knowing this, expect meth nol to deliver only one half as many miles per gallon in a g oline engine. Such is **very far from the case** since metha **burns much more efficiently** -- and always delivers mu more energy **and many more miles** per million Btu of the h of combustion.

When fully utilized, some thermodynamic factors wh counter-balance the lower heat of combustion of metha have shown (10) that in specially developed engines, me anol may deliver almost the energy of gasoline. Methanol mi age may be expected then to be from about 8% lower to ab 4% higher in, for example, what Ford envisages as the "av age vehicle of the 1990's."

One of these several possible benefits is the cracking methanol by heat taken from the engine's exhaust to give and H_2. The combined heat of combustion of CO and gives 22% more heat than does methanol. Much of this pot tial advantage has been demonstrated in cars (11), and m completely in gas turbines (12).

Thermodynamic and theoretical considerations such these show the practicality of the advantages noted by Bank of America's report on its 20 million miles of actual d ing. Hundreds of ordinary drivers have driven many mo of many cars with methanol under traffic conditions ident to those with the same cars when using gasoline. Always methanol has given more power and flexibility of driving car, and a smooth performance with an octane number u 120 when used neat or up to 135 in blends (13) while o nary unleaded gasoline knocks badly.

average of 1.3 gal of neat methanol has given the mileof 1 gal of gasoline in hundreds of cars. Methanol is thus more efficient since 2 gal of methanol has the heat of bustion of 1 gal of gasoline. (Some recent models have n much more efficient, with modern fuel injection and elecic controls as standard equipment to give optimum perhance). This ratio may drop possibly to 1 gal methanol or n less per gallon of gasoline (at least 100% more efficient) n an optimum automotive system is developed to maximthe performance of methanol.

THANOL IN GASOLINE BLENDS

has long been known that methanol eliminates knocking reduces pollution from the exhaust when used in 5 to 15% nds in gasoline(14). Now, large amounts of methanol, often h other alcohols or oxygenated compounds are used daily automobile fuels in this country, a large quantity also in rope. Most of this is in blends of up to 10% in gasoline to prove antiknock characteristics -- cheaper and better than d which causes lead poisoning, or cancer-causing benzene. other oxygenated compound may be a cosolvent to increase mpatibility with gasoline.

The usual motorist might not note a difference, but an operor of a fleet of 2500 cars, the Bank of America (9,10) deterned early that methanol in 5% blends **increased** the miles r gallon for some cars even though it decreased the heat combustion of the fuel by two and half per cent. The miles r million Btu of heating value was increased by from 14 to % depending on the car used. Also the anti-knock chareristics of the fuel was increased significantly with 5% methol added, and equivalent to that of leaded gasoline when % was added. With 5% methanol blends, no added solvent necessary. With 10% blends, a cosolvent may be desirable increase compatibility with gasoline in colder climates, hough the bank has not found this necessary in California.

This study continued using a 10% blend in 15 American and panese cars, starting with the first seven in March 1984. Preus to running on the blend and to establish a base for comrison, each of the cars is run a subtantial mileage on gasoline ne, the same as that used in the blend. The results are tabted and analyzed monthly. Those in Table-I are as of Sepnber 2, 1986, after the cars had been run a total of over e million miles, first on gasoline, then on blend.

The 10% blend gives a slightly greater economy (miles per lon) than gasoline for 6 of the 15 cars, even though the heatvalue of the blend, 90% gasoline and 10% methanol is only % of that of 100% gasoline. Thus relative thermal efficienc using the two fuels is obtained by dividing values in the onomy ratio columns by 0.95 to give the values in the last umns of Table-I. Later cars with automatic sensors and board computer controls of the engine operation generally owed better performance with the blend.

arge engines in older, heavier cars (e.g., those of over 5 s capacity on three old Plymouth Fury V8 models) showed up poorly compared with others in mileage, both on gasoline and on blend, as did also another early car, the 1978 Toyota 6 cylinder Cressida. However, two other cars with V8 engines, 1979 Ford Granadas, while showing the lower mileage of earlier cars with larger engines and bigger, heavier bodies, did show better mileage and better efficiencies with the blend than with gasoline.

Gasoline was standard unleaded, always with an octane number of 87. The same gasoline was used in the blend, and the standard practice of the bank was followed (9) wherein a second, methanol pump simultaneously fed in a proportioned amount, here 10%, of the total volume of the fuel. This blend then gave an anti-knock equivalent of leaded gasoline, which, of course, added to the car's performance and driveability.

The standard practise of the bank was followed, to change oil every 4000 miles. Frequent chemical analysis of the oil drained, for metals present due to corrosion or erosion, showed no differences in using blend or gasoline. When neat methanol is the fuel, a special additive to the oil had been developed and used in a very small amount; but this was not necessary with the 10% blend, and the same oil was used for both fuels.

Long experience has shown the bank that a major engine overhaul is not necessary, but the best economy is to retire cars after being run one hundred thousand miles. Many cars operating on neat methanol had shown that because of the lesser wear and tear on the engine operating at more power but lower temperature with methanol, as compared to operating with gasoline, the most economical life of a car was extended by some twenty five thousand miles. A similar increase of at least ten thousand miles in the optimum economic life has now been shown in the present operation of over a million miles with blends. Thus cars in the table show a very long life when most of it is on the blend; and the lengthening of their life-time mileage indicates that the blend used or the methanol therein cannot be harmful in any way to the engine or its performance.

No cosolvents were added or needed in the 10% blend of methanol, under the relatively equitable year-round California climate. A small amount of additive provided several desirable functions in any use of methanol without increasing fuel cost significantly. Particularly is this noticeable in modern engines with electronic controls and individual direct injection of fuel to each cylinder. However, if the fuel supply is not controlled by the management of a fleet operation; and particularly if the climate has extremes of temperatures, then a cosolvent with a molecule containing oxygen, should be used. This increases the compatibility of the methanol and gasoline if a small amount of water is introduced accidentally.

One suitable cosolvent was found a dozen years ago to be a mixture of higher alcohols, ethanol, propanol, butanol, in an amount of about 20% by volume, methanol 80%. This mixture is made by modifying the several catalysts and operations with the gas streams used in the Wentworth converter. A gasoline blend with 10% of this mixture is an octane enhancer or knock suppressor equal to the lead used in a premium gasoline, the other advantages of methanol are retained, and if a small amount of water gets in inadvertently, it can be tolerated.

CONCLUSION

Contrary to the refusal of the oil industry to regard, or even mention methanol as a synfuel (e.g., 15) this most efficient and economic auto fuel can be produced with 50 to 65% conversion of the heating value of natural gas, any petroleum, distillate, or residue or any solid fuel from peat through coal. When it is to be blended with gasoline the cosolvent, sometimes desired can be produced simultanelusly in the same converter; and the blend will increase the car's mileage, power, and engine life while reducing its weight and pollution in the exhaust. Of probably greater importance, this methanol-higher alcohol mixture, additive, produced from coal at 50 cents per gallon gives the least expensive antiknock performance and without the cancer and other health hazards of benzene, other aromatics and lead.

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TABLE-1
Comparison of Gasoline and 10% Methanol Blend as Fuel in 15 Automobiles

VEHICLE	ENGINE		ECONOMY Mils/Gal		Blend M/G		EFFICIENCIES	
	Liters	Cyl.	Gas.	Blend	Gas	M/G	Relative	Thermal
1978 Plymouth Fury	5.90	V8	13.2	12.5	.95		1.00	
1978 Plymouth Fury	5.90	V8	13.0	10.3	.79		.83	
1978 Toyota Cressida	2.56	6	20.1	18.6	.93		.97	
1976 Plymouth Fury	5.21	V8	12.6	09.9	.79		.83	
1978 Datsun 810	2.39	V6	14.3	16.1	1.13		1.19	
1984 Plymouth Reliant	2.20	4	24.1	26.1		1.08		1.14
1984 Chev. Citation	2.80	V6	25.7	24.4		.95		1.00
1980 Chev. Citation	2.80	V6	20.5	18.4		.90		.94
1979 Chev. Malibu	5.00	V8	13.9	16.4		1.18		1.24
1979 Ford Granada	4.95	V8	13.8	14.8		1.07		1.13
1979 Ford Granada	4.95	V8	12.4	13.4		1.08		1.14
1984 Chev. Citation	2.50	4	26.8	26.0		.97		1.02
1985 Pontiac 6000	2.80	6	18.9	19.5		1.03		1.09
1986 Toyota Corolla	1.60	4	31.1	29.9		.96		1.01
1986 Chev. Nova	1.60	4	34.2	33.1		.97		1.02
Average					92	1.02	.96	1.07

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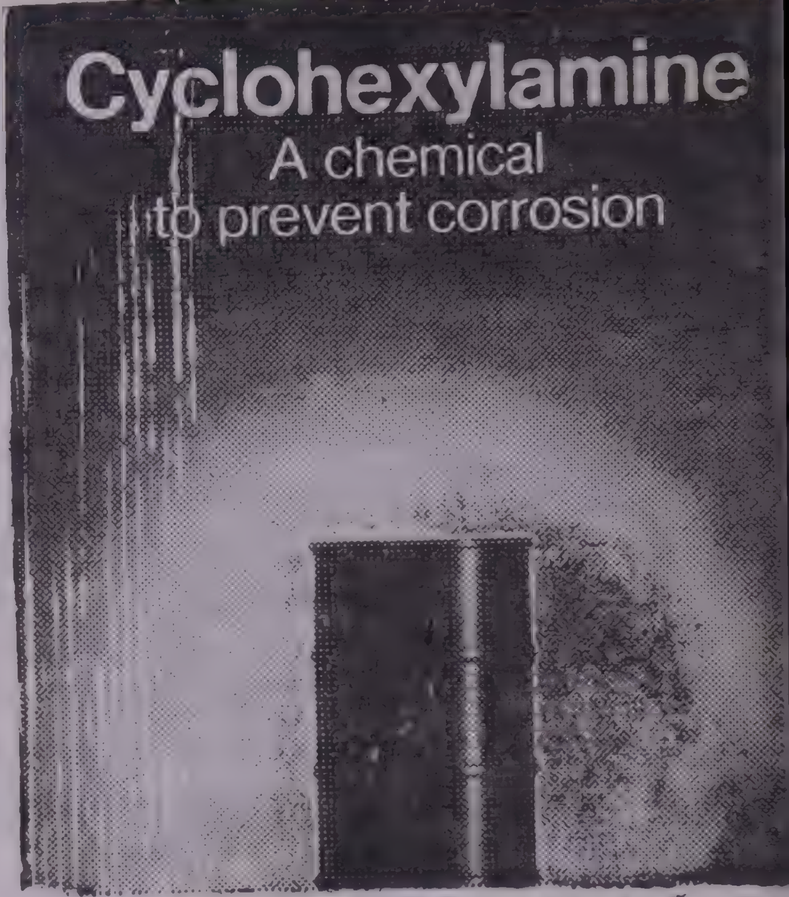

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ONTEDISON PAYS $1.5BN OR CONTROL OF HIMONT

In a deal worth $1.5bn L1,950 bn); Italy's Montedison buying Hercules' 38.7 per cent ake in Himont, the world's argest polypropylene produc- r. This will raise Montedi- on's holding in Himont to 77.4 er cent and the Italian che- icals group says it intends to ift its total stake to 80 per ent through share buying on he markets. This latter move vill allow the Milan-based ompany to consolidate Hi- ont's results and provide tax avings estimated at around 40m.

For Montedison, the deal neans a considerable increase n the group's debt which will ow total around L 8,700bn. But finance director Mauro Mauri says Montedison aims to ave a debt/equity balance and s planning a series of moves to chieve this. Reports suggest hat Montedison may use re- erves from Himont's treasury f $600m as well as a number f divestments to complete the cquisition.

Giorgio Porta, Montedison's nanaging director has stated he group's intention to stream- ine its activities in "non-strate- gic" sectors. This could mean hat the Italian company will uild on a base of petrochemi- als, pharmaceuticals, new ma- erials and services, but may onsider selling fibres, basic hemicals, energy and agricul- ure-related businesses. The group's Montefibre unit is con- idered a prime candidate for ale.

The deal with Hercules brings o an end a four-year partnership's low-cost, up-to-date polypropylene technology with the US group's marketing skills.

Formed in 1983, Himont began as a 50-50 joint venture. It has grown to be the world's biggest PP producer with capacity of around 1.5m ton spread across 10 countries. Himont's market share is currently set at 20 per cent.

Himont's profits have risen steadily from $73m in 1984 to $97m last year, and estimates suggest earnings of over $200m in 1987. Sales were $981m in 1986 and will top $1 bn in 1987.

Hercules' decision to quit Himont is not unexpected and seems to be based on two beliefs. First, that the PP boom is coming to an end, and second, that the company must reduce its exposure to cyclical commodity products. Indeed, the establishment of Himont was the first stage in realizing both these ends.

Many observers do not agree, however, that PP growth and profitability will begin to stall by the end of the decade. The world market is currently estimated at around 11.3m ton/year and growth rate estimates vary from 5-12 per cent per annum. Although new capacity is increasing at a rate of around 10 per cent/year, some of this is low-cost replacement plant.

At present, it is unclear whether Alexander Giacco — ex-chairman of Hercules and current chairman of Himont — will remain with the group. Sources suggest that he may quit if Himont's cash reserve is used to ease Montedison's financial position. Giacco is

use the funds for acquiring competitors and replacing their older plants with new facilities based on Himont's Spheripol process.

Hercules, meanwhile, is thought to be considering a major acquisition. Having left Himont, the group's main businesses are now defence and aerospace and observers believe Hercules will add another high value-added arm, possibly via a big speciality chemical purchase.

ERT POISED FOR BREAK UP

Spain's ERT is likely to be broken up following the acquisition by the Kuwait Investment Office (KIO) of a major stake in the group, according to sources in Madrid. Reports suggest that ERT's most profitable businesses will be sold and that the group will be left with plastics, pharmaceuticals, mining and real estate operations. This would reduce ERT's turnover significantly from a current level of around Pta 220 bn. ($1.8 bn.) to just Pta 15 bn.

Sources say that ERT's Huelva oil refinery is to be sold to Texaco for over Pta 40 bn. It is also expected that the group's defence and explosives activities will be sold either whole or in part to the state holding company Instituto Nacionale de Industrias.

The KIO had earlier said that it intended to merge ERT's chemicals business with those of Barcelona-based Cros and create a Spanish company which could compete alongside the European majors. At the beginning of September it was revealed that KIO had taken a controlling stake in Cros and intends pushing through the long planned merger of ERT's and Cros' fertiliser businesses under the umbrella of an existing joint venture, Fosforico Espanol.

Sources suggest that the Spanish industry ministry is happy with the plans for Fosforico and the government is ready to release credits worth Pta 3.35 bn. and grants valued at Pta 9 bn. to help restructure the company within the terms of the national fertiliser plan.

DU PONT OUTLINES CHINA PLANS

Du Pont is intending to become a long-term business partner with China, according to Frank Aronhalt, chairman of Du Pont China Ltd. He says this decision is based on Du Pont's belief that China will meet its modernization targets and emerge as a major industrial nation.

The US company has already established a good business retionship with China. After setting up its Du Pont China subsidiary in Hong Kong three years ago, the company now has representative offices in both Beijing and Shanghai. It has also concluded seven major technical deals with China valued at over $ 150 m.

Two recent deals involve a $ 52m. contract with Sinochem to build a polyester fibres plant and a $ 10m. pact to transfer synthetic rubber production lines to three plants in Shandong, Shanxi and Siohuan provinces. Du Pont is also marketing over 70 product lines in China.

Sales in Hong Kong and China have reached $ 100m. already this year and the total for 1987 is expected to be up 30 per cent on 1986.

Du Pont says that negotiations are also under way involving technology-transfer deals

for plastics, electronics and membrane technology.

IMC GETS NEW FUNDS

Inetrnational Minerals & Chemical Corp of the US is expecting to receive between $590-620m. from the sale of part of its fertiliser business to the public. IMC's stake in the fertiliser business will be reduced to 50 per cent.

Separately, IMC's animal health unit, Pitman Moore, has signed a marketing agreement with Rhone-Merieux, a subsidiary of Institut Merieux. Under the deal, Pitman Moore will market Rhone-Merieux's products in the US, while the French company will market the IMC unit's products in Europe, Africa and Latin America.

CFC PLAN AGREED

An international agreement to reduce chlorofluorocarbon (CFC) emissions was signed, despite some objections from some of the major producing nations. The treaty, which was being discussed at a meeting in Montreal under the auspices of the United Nations environment programme calls for a freeze in CFC production at 1986 levels.

A further clause of the treaty which would reduce CFC levels by 50 per cent by 1996 was also included. CFC emissions are believed to be linked with ozone depletion.

ENI AND MRH IN JOINT VENTURES WITH SOVIETS

The first chemicals joint ventures involving Soviet and Western European partners have been set up in the USSR. In two separate deals, companies from West Germany and Italy have entered into agree-

col and methyl tertiary buty ether (MTBE) respectively.

The first to be known as Petrokam, is a partnership between the Nizhnekamsknettechim enterprise and the Mulheim, Wes Germany-based trading company Mineralol-Ruhstoff-Hande (MRH) . It is already registered in the USSR and has begu operating.

A 60,000 ton/year fibre-grad ethylene glycol plant is to b set up by Petrokam at Nizhnekamsk by the first half of 1989. Half of the output will be sol on the world market and th rest used internally by the Soviet Union.

The joint operation's capita is Roubles 24m., with the Sovie partner's equity standing a 53.4 per cent and MRH's at 46. per cent.

Under the deal the Sovie Union will provide the ventur with land, manpower and infrastructure while MRH contributes equipment and technology for producing ethylen glycol.

Salzgitter Industriebau o West Germany has been selected as the engineering contractor for the plant. Based o proposals from the West German contractor site preparation at Nizhnekamsk has already begun. The company which will use Denka (formerly Scientific Design) technology needs 21 months to complet the project.

Ethylene oxide feed will b provided by the Salzgitter-buil 200,000 ton/year plant at Nizhnekamsk. This plant alread produces in the region of 15,00 ton/year of antifreeze-grad mono ethylene glycol.

The polyester fibre comple at Blagoveshchensk will requi around 50-60,000 ton/year rt of this will come from a viet-built plant.

MRH, owned by Rudolf roning, an entrepreneur in e Armand Hammer mould, as been trading with the US-R for over 30 years. Its main ne of business is LPG. Kron-g will provide the foreign ex-hange to cover construction nd foreign supplies for the lant.

Meanwhile, Ecofuel, a mem-er of Italy's Eni group has gned a letter of intent to es-ablish a joint venture with he Soviet ministry of petrole-m refining and petrochemi-als.

The agreement calls for the onstruction at the Mazeikiai efinery in Lithuania of a 50,000 ton/year plant to pro-uce the gasoline blending com-onent methyl tertiary butyl ther (MTBE). Snamprogetti vill carry out the construc-ion.

The issued capital of the pro-osed joint venture will be 200-300m and the Soviet Uni-n will own 51 per cent. One alf of the output will be sold broad, mainly in Western Eu-ope through Ecofuel's market-ng network.

The project represents the atest in a number of MTBE lants which Eni is setting up various parts of the world. is already involved in 00 000 ton/year MTBE pro-ects in Venezuela and Saudi rabia. The latest will enable ne Italian firm to receive ITBE from the Soviet Union or the production of gasoline meet new EEC standards hich require that from 1991 l new cars run on unleaded asoline.

TRI IN NEW FERMENTA DEAL

Trans Resources, Inc. (TRI), the New York-based chemicals and fertilizers group is poised to acquire almost all the assets of Fermenta, the beleagured Swedish biotechnology and chemicals company.

In August TRI dropped its original bid for Fermenta after meeting resistance from the company's creditors who are owed more than SKr 4 bn and control most of its stock. The objection centred on TRI's proposed method of repaying Fermenta's loans.

Although the terms of the new bid have not been officially set, the value is believed to be close to the original offer of SKr1.38bn ($216m). TRI is bidding for almost all of Fermenta's Swedish, Italian and US assets, but excluding its bulk penicillin facility at Strangnas, Sweden which requires government approval to sell.

It is not yet clear why the new bid is more favourable, but Fermenta officials and Industrivarden, the company's biggest shareholder say they expect the proposal to win acceptance quickly. It is believed the bid calls for TRI to assume the bulk of Fermenta's debts with only limited write-down. Fermenta would then pay off the remainder of its debt with cash raised from the asset sale.

Bertil Holmberg, Fermenta's president, is optimistic that the deal will be accepted by the firm's shareholders and creditors. He predicted a deal would be reached in "a couple of weeks".

FERRUZZI BUYS SEEDS COMPANY

Ferruzzi, the Italian agribusiness group which has a controlling interest in Montedison, is paying a total of $365m to acquire US soya bean seed producer, Central Soya of Fort Wayne, Indiana.

The deal, which comprises $170m in cash and the assumption of $195m in debentures, takes Ferruzzi into the number three position in the fragmented world soya bean sector. Central Soya has annual sales of around $1.5bn and profits in the $6-7m region.

US soya bean acreages have been declining in recent years from their record highs in 1982-84 and are expected to hit around 60m/acre around 1990.

RHONE-POULENC PAYS $522M FOR STAUFFER BASIC CHEMICALS

Rhone-Poulenc has agreed to buy Stauffer Chemicals' basic chemicals business from ICI for $522m, marking another major step by the French state-owned group in its bid to establish a significant presence in the US market. For ICI the deal means the virtual completion of the programme to sell all the non-agrochemicals businesses of Stauffer, the company bought from Unilever for over $1.7bn earlier this year.

In Paris, a jubilant Jean-Rene Fourteu, president of Rhone-Poulenc said, "What we are buying is exactly the sectors we need and the price we are paying is well below the limits we had set ourselves". Original estimates valued the Stauffer business between $400-450m, but recently this has been revised upwards with some observers suggesting a price over $550m.

In London, ICI director Alan Clements said the company had achieved a very good deal. It has sold most of the Stauffer assets it does not require while recouping over $1bn of its original outlay, he said. Akzo paid $625m for the speciality chemicals businesses in August. ICI hopes to complete the sale of Stauffer's three remaining non-agrochemicals businesses — food products, plastic products and chloralkalis — by the end of the year. Sales for the three total some $100m according to Clements, but US observers suggest this is optimistic.

Stauffer basic chemicals includes three businesses; sulphuric acid and sulphur-based products with sales of $185m; food phosphates and phosphorous products with sales of $230m; and soda ash with turnover of $115m in 1986. Total sales for 1987 could approach $600m.

These businesses are not only considered a good fit with Rhone-Poulenc's own mineral chemicals, but they will help boost the group's US sales from 3 per cent to over 11 per cent of turnover which reached FF52bn last year.

According to Fourteu, the Stauffer units offer considerable synergy with Rhone-Poulenc's FF7bn/year basic chemicals business which includes rare earths, gallium, TiO_2, silicium, nitrates, soda ash, sulphur and phosphates.

In phosphates, the two companies have complementary operations. Rhone-Poulenc is involved in detergent products while Stauffer makes feed phosphates and pharmaceutical products. Combined sales in this area will be around $424m making the French group the largest producer of non-fertilizer phosphates in the world.

Stauffer plants include two phosphorous units at Silver Bow, Montana and Mount Pleasant, Tennessee, and six downstream facilities in Illinois, California, Pennsylvania and Tennessee.

Total soda ash sales will be around $180m. Stauffer is the third largest US producer of soda ash and has a 1.8m ton/year plant at Green River, Wyoming. Rhone-Poulenc will now become the third largest soda ash producer worldwide after Solvay and FMC Corp.

In the sulphur sector, Rhone-Poulenc feels it has the best technology for sulphuric acid production while Stauffer is a specialist in the regeneration of acid from refinery residues.

In the US, Stauffer controls around 66 per cent of the refinery market. It is linked to a number of oil refineries by pipeline and has six regeneration units. Stauffer also has over one third of the US SO_2/SO_3 market and is a leading sulphuric acid producer. Total Rhone-Poulenc / Stauffer sulphur sales will top $250m.

Next year, when the Stauffer units' sales are consolidated, Rhone-Poulenc's US turnover will reach $1.3bn. This represents a major leap from 1985 when the French company claimed US sales of $300m, and on last year's $750m following the acquisition of Union Carbide's agrochemicals business.

ICI, meanwhile, is delighted at paying around 18 times earnings for the Stauffer agrochemicals business. According to Ronnie Hampel, the director for North American operations, fetch 25 times earnings or mor on today's market.

He said the acquisition o Stauffer had pushed ICI fron eleventh to fourth place in th US market, and made the UI group the world's third larges agrochemicals producer.

AKZO TO SELL CONSUMER UNIT

Dutch chemicals and fibre group Akzo is to sell its consumer products division to Sar Lee, the US consumer good company for Dfl. 1.25bn ($621 m).

The division, which is owned jointly with Royal Dutc Shell, is to be merged wit Douwe Egberts, the Dutch subsidiary of Sara Lee involved i the sale of coffee, tea and tobacco.

Akzo's consumer product division reported a sales dro of 13 per cent last year to Df 1.43bn although operating income increased by 5 per cen to Dfl. 91m. The merged company is expected to have annual sales in excess of Dfl. 5.5bn.

FRENCH PAINT FIRM IN US EXPANSION

One of France's leading paints and coatings company, L Seigneurie, a subsidiary of El Aquitaine, has taken a 62 pe cent stake in US-based Decratend Paints as part of its international expansion policy.

La Seigneurie posted a turnover of FF762m ($4,604m) i 1986 of which a third cam from its overseas subsidiarie and it already has a licenc agreement with the Florida based Grow group which produces building facade coating It has a 9 per cent share in th French coatings market.

Decratend Paints of La

l produces paints, coat- s and also markets comple- ntary equipment. It had FF- m sales last year.

Le Seigneurie will take full nership of Decratend Paints hin five years and now hopes gain a foothold in the US nts market and will provide joint venture with its re- rch potential.

NKEL SETS UP DETER- NTS VENTURE

West German's Henkel, has d a 50 per cent share in its ench detergents subsidiary sieur-Cotelle to US-based lgate Palmolive. The deal is lued at FF910m.

Henkel paid FF2bn ($12m) Lesieur-Cotelle which it quired from the Lesieur oup last June. A joint com- ny will be set up pending proval of the venture by the ench authorities.

Colgate also acquires Cotel- subsidiaries in Ivory Coast, negal, Belgium and Luxum- urg worth FF 150m. The ge of products involved in deal include household aning products and soaps. gate's sales in France am- nted to FF3.6bn last year. It three production units and ploys 2,850 people.

ON BOOSTS ITS RFUME BUSINESS

von Products Inc. has ag- d to buy the New York-bas- perfume business, Parfums n, for $160m in a deal whi- will be completed by the of the year.

ne purchase is in line with n's recent acquisitions of ume companies and the ding of units in other in- ries including the sale of a ing catalogue division for $151.2m. The proceeds from this sale will pay for the acquisition of Parfums Stern which will operate as a separate unit within Avon's beauty-products group. In 1986 Avon had net income of $158.7m on sales of $2.88bn.

ATOCHEM CRITICIZES TERMS OF GLOBAL CFC AGREEMENT

France's Atochem claims that the recent international agreement to cut chlorofluorocarbons (CFCs) production and consumption will disadvantage European producers. The agreement signed under the auspices of the United Nations, will cut consumption of CFCs to half the 1986 level by 1998. Production will be reduced by 35 per cent over the same period.

After a compromise, it was also agreed that the EEC commission will apportion consumption cutbacks on a European community-wide basis, but production quotas will be allocated on a country by country basis.

According to Atochem, this latter clause will hit European producers and benefit the US competition. A spokesman said that plants in individual European countries may no longer be viable after meeting production cutback requirements, and companies will not be allowed to transfer capacity from one country to another in order to run larger, viable plants.

In the US, however, this problem will not arise.

Atochem is unable to quantify the costs it will incur following the agreement, but says its Salindres plant is faced with closure, but its other unit, Pierre-Benitei will stay in production. According to Atochem's Maurice Verhille the UN agreement may eventually lead to some companies quitting CFC production entirely.

At ICI, meanwhile, the treaty has been welcomed, although the company said it felt the reduction levels agreed were too severe. Along with Atochem and the other major producers such as Du Pont, ICI expects to have a range of substitute products ready in around seven years.

Estimates suggest that substitutes for CFCs, which are used in refrigeration and as propellants for aerosols, could push up costs of finished goods by between 15-30 per cent. Scientific studies suggest that CFCs damage the earth's protective ozone layer.

MONTEDISON IN $800M FINANCE DEAL

Italy's Montedison is raising $800m in short-term finance through Citicorp Investment Bank to help fund its $1.6bn purchase of Hercules' stake in Himont, the US polypropylene manufacturer.

Initial maturity of the loan is 12 months but it is extendable to 18 months. It is expected that around half of the loan will be drawn, with the remaining funds being raised through existing bank lines and cash.

Montedison, meanwhile, has strongly denied suggestions that it has plans to sell any businesses to pay for the Himont acquisition. The company said that rumours of an impending sale of its fibres arm, Montefibre to ICI were totally untrue.

But it is still likely that, in the medium term, the Italian group may sell some units. Montefibre, Ausimont, Erbamont, Rol and Meta are possible candidates.

M & T CHEMICALS PLANT REPRIEVED

Vlissingen-based M & T Chemicals has been saved from closure after finding substitutes for its main product, TCTH (cyhexatin).

M & T will now start production of catalysts and additives for the plastics industry and it has already increased production of the catalyst trifenylfosfine used in fine chemicals and pharmaceuticals.

The future of M & T, a subsidiary of France's Elf Aquitaine, was threatened when its main customer, Dow Chemical, stopped buying TCTH after tests showed the product (an active ingredient in pesticides) caused foetal damage in rabbits.

TCTH provided 50 per cent of the total turnover of Dfl. 86m ($175m) in 1986. A decision on whether to shed any of the 180 jobs at M & T's Vlissingen plant will be made in January.

UNILEVER UNIT TO INVEST $37M

Dutch Detergent producer Lever has announced a four-year programme designed to refocus its product and marketing strategy. As part of the plan, Lever will invest Dfl. 75m ($37m) in new plant, research and training, and expects to lose up to 180 jobs from a current total of 500.

Vlaardingen-based Lever, a subsidiary of the Unilever group, says in future it will concentrate on developing its three most successful business lines — powder detergents, liquid cleaning materials and soaps for dishwashers.

Lever, which exports around 25 per cent of its output, will buy toilet soaps, abrasives and liquid dishwashing soaps from sister companies within Unilever to supply the Dutch market. The company says the reorganization will simplify production and reduce costs.

POTASH RULES TO BALANCE SUPPLY

In the wake of the Saskatchewan government's severe legislation to control potash output, John Douglas, from US fertiliser consultant Douglas Associates has said that the latest measures will bring the industry's supply and demand into balance in a few months. He added that without the quotas, this equilibrium could take three or four years.

Provincially-owned Potash Corporation of Saskatchewan has raised its export price from $ 53/ton to $ 93/ton, and other local producers such as International Minerals and Chemicals, Kalium Chemicals, which is soon to be sold to Chicago-based Sullivan and Proops, Cominco and Noranda Mines have followed suit with $ 35/ton increases. Foreign producers are reported to have increased their prices as well.

In the US, meanwhile, the National Corn Growers Association has become involved in the Canadian potash dispute. The Association has announced that it is scheduling meetings with the US agriculture department and will lobby against the punitive tariffs imposed o Canadian potash. Other national organisations have als expressed their concern ove the prospect of Saskatchewa imposing its own quota controls. According to Ed Wheeler, an ex-president of the American Fertiliser Institute, overseas imports could provide onl 5-10 per cent of the US farr industry's potash requirement

NEW DUTCH GROUP

The Dutch research organisation TNO and Organon Teknika, part of Akzo's pharmaceutical division, have established a new company to explo diagnostic products from joi research programmes at th Gaubius Institute of TNO.

Three diagnostics tests wi initially be marketed by th new company, OTNO, on a pil basis. The tests are based o monoclonal antibodies for th degradation products fibrin ar fibrogin the levels of which a parameters for diagnosing thrombosis.

MONOCLONAL DEAL

Monoclonal Antibodies, th US biotechnology concern h agreed to pay compensation $ 1.25m in cash and a warra valued at at least $ 2m to Johnson & Johnson over produ quality problems.

Johnson & Johnson's Ortl Pharmaceutical unit stopp selling Monoclonal's ovulati test kit last year after it encountered problems with t shelf life of some deliveries. that time, Ortho was the company's largest customer.

Chemical Markets Abroad

GHT MARKET HELPS UR AUTUMN PLASTICS ICES

A very tight market for most astics has helped lift prices bstantially in September and, rticularly in polyethylene d PVC, buyers and sellers mit that producers now have e upper hand in the market.

With demand having soared ything from 6-13 per cent is year depending on product d capacity — notably for VC — having been trimmed, is not surprising that produ-rs are finally getting some wards.

Strong buying in export mar-ets seems to be one of the keys the surge in West European astics demand. US firms, ith strong domestic demand cope with, have not been as ident in export markets as ight have been expected since e decline in value of the dol-r.

The PVC situation in Western urope is now described by oducers as "very satisfac-ry." Price increases of some pfennig/kg have been imple-ented, taking the price for ge customers to DM 1.55/kg higher for October. In the a £ 30/ton price increase s been implemented taking vels to £ 535/ton and even ge buyers admit they would t expect to pay less than 525/ton, although £ 530/ton s still the top of the market late September. UK buyers e hoping, however, that pri-s will now remain stable for e rest of the year.

Stocks are low on the conti-nt and plants are running out. Imports from the East bloc have dwindled to virtually nothing, partly as a result of plant problems in the severe winter.

All three major polyethylene have been firming in price to more or less equal levels around the DM 1.60/ton mark. Production problems at BP Chemicals and BASF have tightened the market and BP Chemicals has put customers on allocation. Its Grangemouth, UK, plant has minor production difficulties and is due for a 3-week maintenance turnaround at the end of September, which will exacerbate the ldPE market situation.

The market level for September is DM 1.55-1.60/kg and continuing to firm. A major trader reckons it has already sold at DM 1.70-1.72/kg for October. In the UK prices range from £ 525-530/ton, while on export markets over $ 900/ton can be achieved.

Prices of linear low density polyethylene, at DM 1.65/kg, have maintained some differential with ldPE. Some shortages of this product later in the year are expected, especially as the situation in Saudi Arabia is still not clear. Despite assurances from Sabic, there has been some slight tightening of supply. Stocks have been reduced to under four weeks and delivery times in the UK are 10 days to 2 weeks and could go to 3-4 weeks for some grades.

In France, prices are quoted at FF 5.40-5.60/kg delivered to customers, with a 20 centimes increase expected for October. Although the market demand and supply situation is the primary mover behind prices, a tight raw material situation is also likely to have an effect.

PLASTICS PRICE REPORT (DM/KG)

Product	Market Price	
	Last month	Current
High density polyethylene (hdPE)		
Injection moulding	1.50-1.55	1.55-1.60
Film (extrusion) grade	1.60-1.65	1.60-1.65
Blow moulding	1.55-1.60	1.60-1.65
Linear low density polyethylene (lldPE)		
Film grade (butene-based)	1.55-1.65	1.65-1.75
Low density polyethylene (ldPE)		
Film grade	1.50-1.55	1.55-1.65
Polyporpylene (PP)		
Raffia grade	1.70-1.75	1.75-1.85
Injection moulding	1.75-1.90	1.80-1.95
Copolymer	1.95-2.20	2.00-2.30
Polystyrene (PS)		
Crystal	2.50-2.55	2.50-2.60
High impact	2.60-2.65	2.90-2.95
Polyvinyl chloride (PVC)		
Pipe grade	1.45-1.50	1.53-1.58
Paste grade	2.00-2.20	2.00-2.20

The right hand column gives a guide to price levels for large-to-medium size buyers and for general-purpose grades in September. The left hand column shows prices listed in last month's Plastic Monitor.

As one producer commented — the days of oversupply in PE are over. High density injection moulding prices for new business are getting close to DM 1.60/kg, although the market level is still at DM 1.51-1.60/kg for late September, with blow moulding and film grade moving at around DM-1.60/kg.

Polystyrene, producers have noted that the market is not as tight as they had predicted and price rises seen for other plastic products are not expected to be transferred. Price levels have increased in some areas, however and although a bottom line figure of DM 2.45/kg is still quoted, the upper limit stretches to DM 2.85/kg on crystal, 30 pfennigs up on a month ago.

While demand remained strong during the summer, it has slowed in September because of forward purchasing in August. Many feel that it could level off into late October and early November, which may cause prices to drop for the winter. Availability of crystal is better than high impact which is commanding a 10 per cent premium. On the market, high impact trading is around DM 2.90-DM 2.95/kg with some manufacturers' list prices 10 pfennigs higher. Most expect supply and demand to remain firm with something approaching an equilibrium towards the end of October.

Producers are confident that the inevitable October price hikes will be swallowed but there is a chance that some will stick to their September rates. Stock levels have been described as "very poor".

Lead times vary from two to six weeks depending on grades, but supplies seem to be easing after routine summer shutdowns. BASF's West German plant is down until late October and supplies are understood to be below budget even though material was stockpiled.

Demand for polypropylene has remained strong and firm with prices rising steadily by 5-10 pfennigs on all grades against August. The pace of increase is still not as fast as at the beginning of the year, however. Some producers suggest that these increases err on the conservative side. The price of speciality materials has increased by higher amounts. The trend is expected to continue into October, fuelled by customer demand. The monomer price is having less impact than usual, one producer noted. If demand carries on at its current 10 per cent year on year advance sources predict a very tight market in 1988.

Most activity appears to be in homopolymer injection moulding with heavy demand pushing prices to DM 1.95/kg at the top end of the range with an upper price of £ 800/ton for block polymers in the UK. Producers say product is still tight and that the improvement in inventories since August has not put stocks back to normal levels. One said his company was living "hand to mouth" with delivery times extended up to two weeks compared with the more usual two or three days. ICI's Wilton plant in the UK is operating at 50 per cent capacity which is estimated to be costing the company 2-3,000 ton/month in homopolymer supply for an indefinite period.

BENZENE, ORTHO CONTRACTS FOLLOW FALLING SPOT MARKET

A major benzene contra has been fixed between BAS and Deutsche Shell at a pri of DM520/ton for the four quarter. The drop of DM32 ton from the third quarter contract level is not unexpected light of recent spot mark movements and other maj benzene buyers and sellers ar following the move.

Translated at an exchang rate of DM/$1.82 — the lev prevailing at the time the de was closed, the price looks slightly high, at $285/ton again prevailing spot quotes of $26 270/ton. The price is equiva ent to US contracts of 95 cen gallon for October. Norm spot-related volume clauses ar built in.

The deal, which was struc on September 17th, comes surprisingly early, although a buyers and sellers alike poin out, it is in line with contractual arrangements whereby contracts should be fixed in the second half of the final mont before the new quarter.

Orthoxylene prices were fixed between the same maj players at an identical price o DM520/ton. This is DM125/to lower than in the third quarte and again reflects the gener movement of the spot mark and prices in the US.

DSM confirmed it ha fixed a major toluene contract with Exxon at $195/to while Deutsche Shell and Bayer agreed a price of DM380/to for TOI-grade toluene. The relatively low contract leve may put spot under pressure.

Technological Scene Abroad

EW SENSORS FOR FLUE ASES

Catalytic sensors to measure Ox and NOx in the flue gases being developed by Sonoxco d its parent company, Cataly- a (Mountain View, Calif.), un- r an 18-month contract with U.S. Dept. of Energy. The al is to develop **in situ** cataly- devices that cost less than currently used optical sys- ns, says Ralph Dalla Betta, ce-president and chief techni- officer for Sonoxco. Hard- re for the catalytic systems is uch simpler and cheaper, he ys. The principle for measu- ment of oxides of sulfur and rogen is similar to that of So- xco's commercial carbon mo- xide sensors, in which a prop- tary catalyst reacts specifical- with CO to trigger combus- n. Comparing the resulting nperature rise with that of an reacted gas stream indicates amount of CO present. How- er, Dalla Betta declines to say combustion is the reaction ed in the SOx or NOx sensors, to give further details, becau- he says, of patent applica- ns. Sonoxco proved its mea- ement concepts for SOx and x under an earlier Energy ot. contract. The purpose of second-phase work is to de- op laboratory hardware and life evaluation tests. After t, Sonoxco plans to develop nmercial sensors that would sold to instrument manufac- ers.

N KNOW-HOW FOR GAS ARATION MEMBRANES

lew gas separation membr- that have been treated with rine to enhance selectivity the subject of U.S. patent 4,657,564 issued to Air Products and Chemicals (Allentown, Pa.). The invention involves treating polyacetylenic membranes with fluorine to modify the surface chemically. The fluorination process imparts an extremely thin, selective layer that actually performs the separation. The rest of the membrane is unmodified and consists of a dense polymer substrate of unusually high permeability. The combination of permeability, selectivity and ultrathinness of the separating layer results in a process that can operate at lower pressure and requires less membrane surface area, says James F. Roth, Air Products' chief scientist.

TREATING CANCER WITH ENDORPHINS

The body's own euphoric agents — known as endorphins — may be used to halt cancer growth. So asserts Ian S. Zagon of the Dept. of Anatomy and Cancer Research at Pennsylvania State University's Milton S. Hershey Medical Center (Hershey, Pa.) in U.S. patent 4,689,332. Research Corp. Technologies (Tucson), to which the patent has been assigned, is licensing the technology. Endorphins regulate growth of all human cells, including that of most forms of cancer. Zagon uses two drugs that are approved for treating narcotic addiction — naloxone and naltrexone — to stimulate the body to produce more endorphins. When used for narcotic addition, the drugs block endorphin receptors throughout the body, thus preventing a narcotic high. However, the drugs also increase production of endorphins and endorphin receptors. When that stronger concentration of endorphins reacts with the increased number of endorphin receptors on tumor cells, cancer growth is inhibited, says Zagon. The anticancer activity has been demonstrated in animal trials, as well **in vitro** on all types of human cancers, Zagon says. He also is studying the use of naloxone and naltrezone to stimulate the body's growth regulators.

HOW A PROTEIN FOLDS THREE-DIMENSIONALLY

The way in which a protein's amino acid sequence dictates how that protein folds three-dimensionally and then assembles with other proteins is the aim of a study funded by a $2.72 million, five-year grant to Scripps Clinic and Research Foundation (La Jolla, Calif.) from the National Institutes of Health. The project will utilize nuclear magnetic resonance spectroscopy and X-ray crystallography, as well as computer simulation and computer graphics. Research will focus on peptides of a few amino acids and proteins that assemble to form, for instance, a virus.

NAE CALLS FOR INTERNATIONAL BASIC RESEARCH EFFORTS

Warning of "technical isolationism," a committee of the National Academy of Engineering (NAE) urges cooperative basic research between U.S. and foreign engineers in a wide range of fields. For example, the panel says, West Germany, Japan and the U.K. are strong in biochemical engineering and in synthetic fibres, while Japan, the U.K. and the Soviet Union have expertise in composite materials. And there are excellent programmes in risk assessment and management in West Germany, France the Netherlands, Sweden, Switzerland and the U.K.

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- (Flakes, Solid, Bits)
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- Sodium Meta Bisulphite
- Sodium Bisulphate
- Sodium Acetate
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Biotechnology

DRUG FIRMS RAISE AIDS RESEARCH EFFORTS

Wellcome is dismantling its limited distribution system to increase the supply of its Aids respite therapy, zidovudine. This means that the drug will now be available to doctors in the US and UK through normal distribution channels in the next few weeks.

Increased supply of the key raw material thymidine from Pfizer and Wellcome's production capacity increases have allowed the company to shift its strategy. Wellcome now has £17m ($28.2m) of additional capacity in the US and UK onstream. Also the firm claims to have made improvements to the scaling up of the 16-stage synthesis of zidovudine.

Wellcome is now also in a position to step up clinical trials of the drug in combination with other potential antiviral compounds such as its herpes treatment, acyclovir and the interferons. Nevertheless, mixing compounds does not necessarily guarantee a summation of effect. Zidovudine loses much of its effectiveness when combined with ribavirin.

One potential candidate for combination therapy is dideoxycytidine (DDC). Earlier this summer Wellcome applied for a US patent for DDC on its own and in combination with zidovudine. Hoffman-La Roche also has an interest in DDC following the US department of commerce's decision to hand over its rights to the Swiss major.

The latest clinical results of DDC show the compound to be more toxic than first thought. Initial results of phase 1 trials show evidence of biological activity against the Aids virus but also some instances of peripheral neuropathy. These instances of side effects "may be reduced or eliminated by lowering dosage of the drug," according to Patrick Gage, Roche director of exploratory research.

Gage notes that the reaction "occurs at a dosage of the drug that was chosen for initiation of these studies and we are now working hard to study lower doses to avoid this problem."

Phase 1 studies are being conducted in the US national institute of allergy and infectious diseases' Aids treatment evaluation units. Roche is keen however to take on board all the later trials to maintain closer control of critical data necessary for licensing.

Meanwhile, the US food and drug administration is being urged to give fast track approval to granulocyte macrophage colony stimulating factor (Gmcsf) as an Aids therapy. Researchers from the New England Deaconess hospital and the university of California in Los Angeles have reported that Gmcsf increases the numbers of several critical kinds of immune cells in 16 Aids patients.

Gmcsf acts on bone marrow cells in an early stage of development to stimulate production of white blood cells. But, a report in the September 3 issue of the **New England journal of medicine**, reveals that the drug boosts the T-cells in some patients although the effect has not been explained.

The editorial in the journal urges the US government to expedite approval. "The review procedures of the food and drug administration, designed in an effort to protect the public, can so stultify clinical investigation that many patients may die or remain seriously ill before broader application of a promising agent is permitted."

Bayer and Hoechst, who earlier this year agreed to collaborate in the search for an Aids vaccine, are still to reveal the details of their project although it will cost the partners between DM20-30m ($35.8-53.7m) over the next few years. The two companies are also looking for drugs to treat Aids patients.

Hoechst's Behringwerke is working on the promising Gmcsf in collaboration with Immunex of the US. Bayer is currently testing Suramin as a possible treatment although side-effect profiles do not look promising. Nevertheless Bayer's subsidiary Miles is believed to be developing analogues of suramin for use against the Aids virus.

GENZYME SELLS UNIT

Genzyme Fine Chemicals in its push to focus on the health-care market have sold its Koch-Light research products operation lock, stock and barrel to New Brunswick Scientific.

The sale, according to Dr. Geoffrey Cox, managing director of Genzyme (UK), forms part of the the company's plans for continued growth and development in pharmaceuticals.

New Brunswick Scientific sees the acquisition of Koch-Light as complementary to its existing businesses. "We believe that Koch-Light has a profitable future and it will allow us to expand our range of research products," a company spokesman said. The price tag has not been revealed.

MMISSION MISSES OWN TECH RULES DEADLINE

Plans by the European com-
ssion to introduce a series of
ectives regulating biotechnolo-
by the end of this summer
ve fallen behind schedule.
ussels is currently preparing
r directives which are unlike-
to be introduced until the end
this year.

Officials within the environ-
nt directorate, DGXI, are pre-
ring the final draft of the dir-
ive designed to regulate the
liberate release of genetically
gineered organisms. West
rmany and France are believ-
to be the most outspoken cri-
s of the proposal.

The commission now has to
cide whether the latest draft
eds further consideration by
perts in member states or to
nd it straight to the council of
nisters. The first option is
obably the most likely course
action as the commission is
eking as many opinions from
erested parties as possible.

DGXI is also putting together
proposal for a directive regu-
ing waste control and accident
evention. According to sour-
s this draft is unlikely to be
dy until the end of this year.
e containment guidelines dir-
ive from DGIII and the occu-
ional safety directive from
V are likely to be delayed
en further.

Probably the single largest in-
ence in the delay was the pro-
stination by the UK govern-
nt on approval of the EEC re-
rch and development frame-
rk programme. This delay
d up research efforts to assess
potential risks associated
n biotechnology. The distri-
ion of funds earmarked by
commission to improve the
npetitiveness of European bio-
nology efforts has held up.

The global research effort to map the human genome has reached the 10 per cent mark although half of this has been revealed in the past four years. The effort, first started in 1973, has so far mapped 3,000 genes.

MIP DELAYS BOURSE LAUNCH

Bio-MIP, the investment fund of the Netherland's Maatschappij voor Industriele Projection (MIP), which has biotechnology interests, is delaying its listing on the Amsterdam stock exchange's parallel market until spring 1988 at the earliest. In June, the MIP's chairman, J. Blaak, announced that the Bio-MIP would go public this autumn, but the bourse climate and the fund's incomplete portfolio have delayed this step.

The MIP now has 12 partners from US high-tech companies, most of them in electronics, computers and biotechnology. Pennsylvania-based Centocor, producer of monoclonal antibodies for diagnostics, has invested $2.5m in Bio-MIP. Molecular Genetics, of Minnetonka, Minnesota, which specializes in genetic manipulation for agricultural purposes, has a share worth $2m. Ovabloc, of Stamford, Connecticut, a medical equipment producer, has invested $1.5m. A large $5m stake is held by Cetus Corp, of Emerryville, California, manufacturer of anti-cancer drugs and developer of interleukin-2.

By delaying the introduction of Bio-MIP to the bourse, MIP will be able to add more biotechnology companies to the fund, thus making it more attractive to investors. MIP plans to expand its American high-tech company portfolio from 12 to 17 by spring 1988, with several of its new participants being biotechnology firms. Bio-MIP will then be able to "offer a fully fledged fund to Dutch investors," said MIP's US representative, Hans Severiens.

ABBOTT SEEKS NEW ANTIBIOTICS

Researchers at Abbott Laboratories have designed compounds that may herald the emergence of a new class of antibiotics. The US team has targeted a key bacterial cell-wal enzyme for possible inhibition by the new drugs. This enzyme, CMP-KDO synthetase, is unique to gram negative bacteria.

Peptide prodrugs of the compound, alpha-C-(1,5-anhydro-7-amino-2,7-dideoxy - D - manno - hepto - pyranosyl) - carboxylate, the researchers report, disrupt the formation of the lipopolysaccharide wall.

"But these agents are not amenable to further development although they do prove that the concept works," according to Robert Goldman, head of the microbiology project.

The current compounds being investigated have very short half lives and an activity spectrum that is not wide enough. "Nevertheless, we are hoping to pursue this area as well as looking at other potential targets," explains Goldman. The researchers have reported their findings in the September 10 issue of **Nature.**

UNITANK ACQUIRES

Unitank Terminal Service, the Philadelphia-based liquid terminal group has acquired Petromark, the fats and oil storage company based in Richmond, California.

Petromark's product and storage assets will be moved to Unitank's existing 350,000 barrel facility at Richmond, increasing the company's capacity in the San Francisco Bay area to more than 600,000 barrels.

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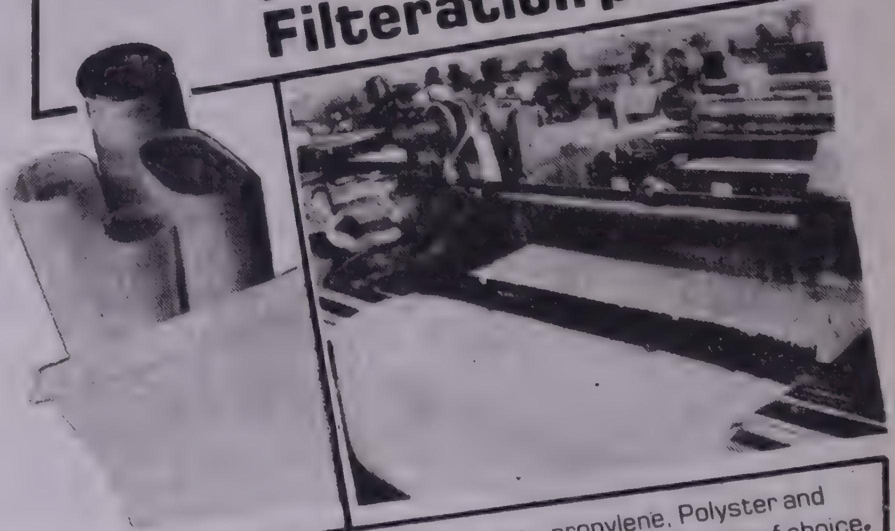

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Environment

EUROPEAN ENVIRONMENT SPLIT

European member states appear to have different priorities concerning environmental problems associated with agriculture. At a recent informal council meeting of agriculture ministers a definite division emerged.

The French, Belgian and West German ministers believe that the most important environmental problems are not linked with agriculture but to incidents such as the Rhine chemical spills. The Dutch minister claimed that only problems associated with air and water of a community matter.

Frans Andriessen, the EEC agriculture commissioner, is urging member states to press for the adoption of polluter pays principles. The commission is currently planning tough regulations for pesticide use and fertilizer controls. Agriculturally derived ethanol did win interest with the ministers and they are likely to invite the commission to take a position to increase research efforts.

CIA SLAMS UK EDC PROPOSAL

UK Government plans to wind up the chemicals economic development committee (EDC) have been slammed by the chemical industries association. While supporting the government's plan to slim down the national economic development organization (Nedo) the CIA is opposed to the plan to retain only the specialized organics and pharmaceuticals EDCs:

"There would be a risk that these two specialized groups would be seen as representing the whole of the chemical industry within the Neddy [Nedo] framework which they are clearly not equipped to do," warns CIA director general John Cox.

TOLEDO PUTS ITS SLUDGE OUT TO PASTURE

Officials of Toledo, like many of their counteparts, are searching for ways to handle sewage. And although it's not a new idea, as at least a partial solution, they have decided to convert the material into fertilizer, with the prospect of selling it to farmers, and for use in land reclamation. To that end, the Toledo officials have reached a preliminary agreement to use a sludge-to-fertilizer process developed by N-Viro Energy Systems, a Toledo-based waste utilization company, with the help of the Medical College of Ohio in Toledo. N-Viro will build a plant, projected to cost under $ 1 million, and operate the facility, treating 160-200 tons/day of wet sludge.

The process, patented in 1985, combines two technologies — advanced alkaline stabilization and subsequent accelerated drying, which produces a dry, granular, nearly odorless fertilizer. "The primary advantage of the technique is its simplicity, which keeps costs low," says N-Viro President Pat Nicholson. Operating costs, including capitalization, are expected to be $90/dry ton. The product, N-Viro Soil, is made by mixing kiln dust (a byproduct of the cement industry) with dewartered sludge, then aerating the mixture. The result is a pasteurized, organic fertilizer that retains the nutrients of both ingredients — the nitrogen and phosphorus from the sludge; and the potassium, calcium and sulfur from the kiln dust.

Nutritious sludge

"It's the only processed sludge I'm aware of that has all those nutrients", says Dr. Jeffrey Burnham, a professor of microbiology at the Medical College of Ohio and adviser to N-Viro. "What we're really excited about," he continues, "is the reduction of pathogens with the treatment using kiln dust or lime. We are achieving levels that are difficult to obtain."

While the product is low grade — containing 3% nitrogen, 5% phosphorus, 3% potassium — Nicholson expects agriculture to be the prime market. "The cost to the farmer will be low, about 50% of the price of a comparable commercial fertilizer," Nicholson maintains. S&L Fertilizer (Whitehouse, Ohio) will market N-Viro Soil to farmers and dealers in Ohio.

Another targeted market will be land reclamation. Terry Logan, an Ohio State University agronomist who is directing a demonstration of the agronomic value of the fertilizer, says, "The fact that it has lime in it makes it very good for strip-mined land, which has a lot of acid." He adds that because of the presence of kiln dust, the material has a slightly higher nutrient value than is obtained with other pasteurization methods.

The problem with sludge recycling is public acceptance of the plant, says Tom Kovacik, Toledo's director of public utilities. Toledo is currently trying to find a site for the plant where it will be accepted by the community.

Processed sludge is not going to have a dramatic impact on fertilizer sales. A study by Logan found that if all the sludge in Ohio was land-applied annually, it would cover only 2% of the state's farmland. But municipaliycling their sludge is a far aper method of disposal than dfill and incineration. Kovacik ues, "We cannot continue to mp sludge the way we did in 1950s. It's obvious that citi- have to go for reuse."

ditional is out :

The Environmental Protection ency (EPA) is promoting the cycling of sludge if it is clean ough, says Bob Bastion, an en- onmental scientist for EPA. 's becoming more and more fficult to use some of the tradi- nal disposal practices. Incine- tors are expensive to build. ere is less and less landfill ca- city available. A lot of local thorities are imposing 40-50% lids requirements in landfill, d that's hard to attain," Bas- n contends.

Bastion cites a survey show- g that in 1986, 178 municipa- ies or countries were design- g, building or operating com- sting plants to recycle sludge. mpared with only 90 in 1983. lot of it has to do with the ice of fuel, the availability of dfill space, and how strict the gulations are," Bastion abser- s.

Composting, in which wood ips are added to sludge, has en a popular recycling method. e city of Akron has $33 mil- n composting facility that has en in operation since early 87. Its operator, Compost Sys- ns (Cincinnati), also develop processes for Columbus, io; Baltimore; Clinton County, w York; and has a project h Oxnard, Calif. With Akron's cess, the bulking agent is ed with the sludge, aerated 14-21 days while being heat- to 135-140 F. It produces a conditioner, rather than a ilizer, which can be used for land reclamation, landscaping and horticultural applications.

The product is not used for farmland because of the potential for heavy metals, says Richard Ryan general manager for compost systems. Ryan reports that the generating plants on the East Coast are able to sell every bit of compost produced.

Low costs :

Operating costs, including capitalization, at the Akron plant are about $150/dry ton. Ryan says that in a life cycle analysis, the cost is relatively low, compared with those for incineration or landfilling.

Sludge has been recycled for a long time. For example, the city of Milwaukee has produced and sold Milorganite for the past 60 years. It uses aerobic digestion, in which bacteria consume solids in the sludge. The sludge is eventually heat-dried to a 95% solid granular product containing 6% nitrogen and 2% phosphorus. The material is sold throughout the U.S. for use in turf building and landscaping. According to J. Michael Malk, manager of market development for the Milwaukee Metropolitan Sewer District, operating costs are $250/dry ton, an operation that costs the city $150/dry ton after a $100/ton sales revenue. "However, considering the alternatives," Malk says, "it's the most cost-beneficial way of handling our material, and we're recycling a valuable resource,"

Ohio State's Logan says sludge recycling will never produce money for municipalities, "but it will cut the cost of disposal considerably." P. C. Williamson, manager of the Waste Technology Development Center of the Tennessee Valley Authority (Muscle Shools, Ala.), says recycled sludge should be excellent fertilizer for certain applications in soils that are low in organic matter. The center is working with a private company that wants to convert sludge into fertilizer. "Municipalities are going to have to do something with their waste," Williamson says. "While there is some concern with heavy metals in areas of heavy industrial waste, I am optimistic that it is a viable way to utilize waste to our benefit." Comments Logan: "If it's clean enough to meet federal regulations, that will be the way to go."

DSM EXPANDS R&D

DSM Research, the corporate R&D arm of the Dutch chemicals group is expanding its laboratory facilities at Geieen. The planned Dfl. 60m ($29.5m) facility will complement the recently completed Dfl. 60m unit and will focus on potential high value products such as fine chemicals and advanced materials technology.

Earlier in the summer, DSM brought on stream a laboratory focusing on organic chemistry and biotechnology. The two facilities are part of a Dfl. 200m five-year plan to expand and refurbish existing research laboratories. Currently, the firm is spending about Dfl. 250m/year on research and development, rising to Dfl. 300m/year by the end of the decade.

Although DSM is expanding its research facilities it is unlikely to increase the number of projects for the time being. "Two years ago the company decided to focus on biotechnology, fine chemicals and advanced materials. We are not yet in the phase to develop new projects until current projects move closer to the marketplace," a company spokesman said.

News from Japan

MITI to Survey World's Rare-metal Deposits

The Ministry of International Trade and Industry (MITI) will inaugurate next fiscal year a 3-year project aimed at making a world-wide survey of rare-earth/rare-metal deposits and developing technology for separating/refining the items. Metal Mining Corp. will implement the project.

MIT will make a related Y120 million budgetary request for fiscal 1988 with regard to Powder Development Special Account.

The target rare metals are titanium, niobium, tin, and gallium, etc., while the rare earths include yttrium and lanthanum, etc. They are used as superconductive materials. It is feared that they will be in short supply when high-temperature superconductive material is put into practical use.

The world's rare-earth deposits are estimated at 47 million tons and annual production reaches about 43,000 tons. There is ample leeway to exploit new mines.

MITI forecasts that annual demand for yttrium will amount to 10.4 tons if coils and copper wire currently being used for power generation and high-tension power transmission, respectively, are replaced by yttrium-based superconductive material.

Novel-material Business Rise 30%; Advanced Inorganics Jump

The Ministry of International Trade and Industry (MITI) has reported a considerable increase in the number of companies involved in manufacture of novel materials and that of the items they are producing, compared with the year-before levels. The results were obtained from the answers by 250 companies to a questionnaire sent to 402 companies.

MITI has conducted a survey on business in novel materials in Japan once a year since 1985 by sending questionnaires to basic-material manufacturers. The latest survey shows that the number of companies engaged in new-material business increased 30 per cent and that of the items of new material they handle was up to 60 per cent over the preceding year.

By category, items of inorganic materials with elaborate functions produced by the 250 companies which answered the questionnaire numbered 526, accounting for 34 per cent of the total; those of elaborate-function high-polymers, 423 or 27 per cent; elaborate-function metallic materials, 275 or 18 per cent; composite materials, 215 or 14 per cent; and those which cannot be classified as exotic materials but are prerequisities for processing novel materials numbered 111 or 7 per cent.

Compared with the preceding year, the number of items of elaborate-function high-polymers surged 80 per cent; elaborate-function metallic materials, 70 per cent; composite materials, 60 per cent; and elaborate-function inorganic materials; 50 per cent.

Looking at these materials by property, those which have been imparted with advanced mechanical properties such as lightness, strength and rigidity accounted for 40 per cent of the total; those with improved thermal properties, 20 percent; those with advanced electrical and electronic properties, 16 percent; those with improved chemical and / or biological properties, percent; those with improve magnetic functions, 4 percen those with advanced optical fu ctions, 8 per cent; and thos with improved radiation prope ties, 2 per cent.

Over the last three year these shares have not change markedly. Priority has apparen tly been placed on improveme of mechanical and thermal pro perties.

Of the 250 companies whic answered the questionnaire, 12 revealed that their sales from n vel-material business stood a Y 882 billion in total, accountin for 3 per cent of their combine total sales of Y26,736.9 billio Of the 120 companies, 20 eac chalked up sales of more tha Y10 billion from novel-materia business.

TEC Establishes New Firm For Int'l Plant Procurement

Toyo Engineering Corpora tion (TEC) recently announce that it had established Protech Corp. The new company is i charge of world-wide machinery parts procurement service fo various plants. Furthermore making the most of Toyo Eng neering's accumulated experien ce in overseas procurement, th new company will conduct spare parts service, export and impo unique products other than pla ts, and hold consultation abo small-to-medium-sized enterpr ses' manufacturing facilities.

The new company was esta lished July 1 and is capitalize at Y50 million and owned 10 per cent by TEC. The head o fice is located in Funabashi Cit Chiba Prefecture. Managing Di ector Y. Takagi of TEC has a sumed the presidency of the ne company. There are 22 em ployees.

port Of Titanium Dioxide creasing

Demand for titanium dioxide ntered on export has been on e increase beyond expectation. onsequently, it is likely to have come necessary to revise de- and estimates for the latter lf (July-December) of this ar.

Japan Titanium industry Asso- ation issued, at the beginning this year, a report on demand timates for this year, which t domestic demand at 165,990 ns and exports at 66,780 tons, r a total of 232,770 tons.

Thus, it was estimated that th domestic demand and ex orts would increase 2.0 per nt over the previous year.

However, regarding deliveries esuits) in the first half of this ear, domestic demand register- l 83,018 tons and exports re- rded 36,091 tons, giving a to- l of 119,109 tons, increases of C, 7.9 and 6.5 per cent, res- ctively, over the same period the preceding year.

Thus, exports increased by out 2,700 tons, rising 8.1 per nt, and the total showed a 2.3 r cent increase.

It is doubtful whether exports n continue at the same tempo they did until June, since Ja- nese manufacturers have adop- l a domestic-demand-first poli- and their export capacity has en dropping because produc- n has already reached the it.

So far, however, demand for nium dioxide in overseas co- ries has been on an upward nd.

e-Ceramics Production in 00 Estimated at Y4000 Billion

apan's combined production of ceramics in the year 2000 reach Y4000 billion this is shown in a long-term demand estimate recently compiled by Japan Fine Ceramics Association. The figure is nearly equal to the upper limit of demand estimates ranging from Y2,800 to 4,200 billion, which were formed in 1984 by Fine Ceramics Council.

The association projected the demand on the basis of 1985's production results. Growth rates of each user industry and component ratios of their consumption of fine ceramics were taken into account for the projection.

It is forecast that production of fine ceramics for electromagnetic use will total Y1,787.5 billion (three times as much as the figure for 1985) in the year 2000, those for mechanical use, Y252 billion (likewise, 2.4 times); those for thermal use, Y422.3 billion (7.3 times); those for chemical/medical use, Y178.9 billion (3.0 times); those for optical use, Y1007.1 billion (31.3 times); and those for use in atomic power generation and manufacture of superconductive material, Y 491 billion (410 times).

The association says that fine-ceramics industry will progress markedly on the strength of development of ceramic parts for engines, bioceramics and superconductive ceramic materials. It forecast that heat insulation for diesel engines, recovery of waste heat discharges from the engines, and reduction of the weight of high-temperature mobile parts for all types of engines will be implemented after 1990; and ceramic parts for gas turbines will be put into practical use after the year 2000.

The association will prepare within this year a report on expansion of application of fine ceramics to new areas involving outer space and the ocean.

Toyo Carbon to Advance into Advanced-ceramics Business

Toyo Carbon Co. is going to enter advanced-ceramics business. Utilizing its technology for fine-powder manufacture, molding and sintering, which it has accumulated through its manufacture of isotropic high-purity carbon products, it has begun shipping samples of hot-pressed ceramics for use in electronics and machine parts.

It is now producing on a trial basis a variety of advanced ceramics, such as carbide-, nitride- and halide-based ones as well as composite ones, and is intent on commercializing them in accordance with user response. Its Chigasaki factory is the main base for these operations.

This step is the result of R&D efforts over about two years at its laboratories. It has introduced advanced granulating equipment and an evaluation system for measuring the strength and anisotropy of products, etc. It believes that its hot press with 2-ton capacity at 2,000°C, installed at the Chigasaki factory, is effective for producing advanced ceramics.

Ube Industries Marketing New Intermediates For Drugs

Utilizing its manufacturing technology for making intermediates for Vitamin B1, Ube Industries Ltd. has succeeded in developing two new intermediates for drugs, methyl 3,3-dimethoxypropionate and methyl 3-methoxyacrylate, reportedly for the first time in the world.

Commencing distribution of samples of these new products, the company has made it clear that it now plans to build a manufacturing plant with a special gas-phase reactor at an investment of about Y100 million in

Ube, Yamaguchi Pref. with full-scale production due to start from the spring of 1988.

These intermediates are derivatives of formyl acetate, and it is considered possible to make various types of derivatives of formal acetate, and it is considered possible to make various types of derivatives utilizing their particular functional groups. Ube intends to use these new products as central items for its range of specialty chemicals in the future.

Ube Industries is now drafting out its second intermediates 3-year plan for each of its divisions. For the business of specialty chemicals including catechols, the company is making efforts to develop new products to answer to users' needs, aiming at an annual sale of more than Y10 billion.

The two new pharmaceutical intermediates developed this time have been worked out on the basis of oxidation technology using alkyl nitrite which has been established by Yamaguchi Fine Chemicals Co., a joint venture of Ube Industries and Takeda Chemical Industries founded for the purpose of manufacturing diamine, an intermediary material for vitamin B1. These are very rare compounds which have never been mass-produced and which do not appear in the list of reagents.

According to Ube, these compounds are derivatives of formyl acetic ester, whose functional group can be used for synthesizing various types of derivatives including, such heterocyclic compounds as pyrimidine and pyrazole. The company has indicated that they can possibly be used for the manufacture of anti cancer drugs.

Ube is now ready to distribute samples of the new intermediates produced on a bench scale. Since these items are known only to the extent that they are used for a few compounds appearing in the literature, Ube expects that its users will develop a wide range of applications.

Nissan Chemical successful in mass-producing prostanglandins

Nissan Chemical Industries, Ltd. has announced that it has developed, together with Professor H. Sato or Tokyo Institute of Technology, mass-production technology for prostanglandins (PGs), important bioactive substances effective for treatment of heart disease and peptic ulcer, etc.

The new process ensures easy production of natural-type PGs as well as non-natural-type ones, the company says. It has already succeded in commercializing carbacyclins, kinds of PGs developed by The Sagami Chemical Research Center. The recent success enables Nissan Chemical to mass-produce almost all types of PGs.

Japan's PG market is estimated at Y20 billion a year but difficult mass-production has been the bottleneck in expanding the market.

The new process easily combines a pentacyclic ring with an alpha-chain with the required chain at low cost and using Grignard's reagent. After finishing studies on technical aspects, at its research laboratories the company intends to start mass production of PGs as early as possible at its Onoda factory.

Continuous production Method for perfect Meso-phase Pitch Bared

Maruzen Petrochemical Co. has established technology for continuously producing perfect meso-phase (liquid crystal) pitch which is most suitable for pitch based carbon fiber. The produc has been supplied to carbon-fibe makers in sample form and has been highly rated by them.

The company is planning to build a 100-300 ton/year semi commercial plant within one o two years and start marketing the product on a commercial basis. It is now endeavoring to improve related plant engineering technology in a bi to cut down production cost.

In a move to diversify into carbon-fiber operations, it introduced four years ago batch-type production technology for meso phase pitch for use in high-performance carbon-fiber production from Government Industrial Research Institute, Kyushu. This technology is designed to produce premeso-phase pitch by hydrogenating coal-tar pitch, filtering the resultant product, subjecting it to vacuum distillation thereby producing hydrogenated pitch, and subjecting this product to thermal treatment. The company has remodeled the technology into a continuous process for industrial use and has built a 1-t/y pilot plant.

Meso-phase pitch produced by the new process has these features : (1) its softening point is 300°C, thus facilitating low-temperature spinning; (2) it contains only a small amount of insoluble quinoline and the molecular weight distribution concerned is "sharp"; (3) it is in a perfect meso-phase state when observed by means of a polarization microscope; (4) it can easily b spun into carbon fiber. The carbon fiber thereby produced ha tensile strength of more than 400/kg/mm^2 and modulus of elasticity of more than 40 tons mm^2

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MARKET INFORMATION

Chemicals, Dyes Steady

Owing to oncoming Diwali, the rend in the prices of Chemicals and yes showed a steadiness, except for henol, MEK, cyclohexanone & DEG hich went up by Rs. 3 to Rs. 4 per g. on account of ready supplies. No ajor commitment was entered. Traders were busy collecting their dues and settling the accounts.

Soda ash and Caustic soda remained steady to firm while titanium dioxide was in short supply. Solvents had normal turnover.

The dyes had better sentiment. Upcountry enquiries and local trading were good.

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and a seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

(Prices as on 15th October, 1987)

NDUSTRIAL CHEMICALS	Per kg.
mmonium sulphate	2.00
mmonium phosphate (Mono)	14.50
mmonium phosphate (DI)	12.00
mmonium carbonate (DI)	17.00
mmonium bicarbonate	4.75
mmonium chloride	5.75
mmonium nitrate	4.50
rsenic white powder	21.00
crylamide	58.00
arium carbonate	6.00
leaching powder (33% Cl)	4.00
orax (Granular)	14.00
orax (Powder)	15.50
Boric acid (Tech.)	22.00
Bisphenol-A	60.00
Butyl carbitol	35.00
Caustic soda (Flakes)	7.60
Caustic soda (Solid)	7.75
Caustic soda (Lye)	6.00
Calcium chloride 70% (solid)	3.25
Calcium chloride 75-80% (fused)	3.50
Calcium chloride 96% (Anhydrous)	5.00
Calcium carbonate (PPT)	3.00
Calcium carbonate (Activated)	3.55
Camphor (Indian)	90.00
Cresylic acid	49.00
Cream of Tartar (Tech.)	64.00
Citric acid (Belgium)	40.00
Citric acid Indian	40.00
Copper sulphate	15.75
Chromic acid	40.00
Cyanuric chloride	95.00
Cobalt oxide	280.00
Carbitol	54.00
Dicalcium phosphate (Anhydrous)	16.00
Ferric chloride (Lumps)	5.50
Ethylene urea	56.00
Glue flakes	8.45
Glue sheets	6.75
Gohsenol GH 17	74.00

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— ON COTTON, POLYESTER/COTTON, NYLON

(Excellent Fastness, Withstands Carbonising and Alkaline Wash with Hydro & Caustic)

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Contact MANUFACTURERS and IMPORTERS :

Visen Chemicals Pvt. Ltd.

222/A, Virwani Industrial Estate, Western Express Highway,
Goregaon (East), Bombay-400 063. Phone : Resi.: 6722385

Hydro	33.00
Hyflosupercell	17+ST
Hexamine	29.00
Industrial Wax	25.00
Litharge	22.00
Lead Acetate (Tech.)	26.00
Lithopone	35.00
Magnesium chloride (crystal)	3.00
Menthol crystal (Flakes)	185+Ex.+ST
Menthol bold	205+Ex.+ST
Menthol crystal bold	245+Ex.+ST
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	15.00
Maleic Anhydride (per kg.)	47.00
Mercury (75 lbs)	5,500.00
Nickel chloride	49.00
Oxalic acid	23.50
Peppermint oil (Rectified)	90+Ex.+ST
Potassium carbonate (Indian)	19.00
Potassium carbonate (Imported)	21.00
Potassium bichromate	22.00
Potassium phosphate (Mono)	14.00
Potassium phosphate (DI)	14.00
Polyvinyl alcohol (No. 117)	88.00
Polyvinyl alcohol (No. 173)	90.00
Polyvinyl alcohol (No. 208)	89.00
Paraformaldehyde	15.00
Phthalic anhydride 96%	23.50
Pentaerythritol	63.50
Paraffin wax	13.75
Rangolite (German)	60.00
Rangolite (Czech.)	42.00
Sodium sulphate (Fine)	4.00
Sodium sulphate (Coarse)	3.80
Sodium sulphide 50-52% (Flakes)	8.25
Sodium sulphide 58-60% (Flakes)	9.25
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite	12.90
Sodium chlorite 80% (Spain)	84.00
Sodium chlorite (50% span)	75.00
Santobrite (Indian)	36.00
Soda Ash (Tata)	3.85
Soda Ash (Birla)	3.50
Soda Ash (Imp.)	3.50
Sodium bicarbonate	5.50
Sodium bisulphite	4.50
Sodium silicate	3.00
Sodium acetate	6.40
Sodium alginate	160+ST
Titanium Dioxide (Anatase)	53.00
Titanium **Dioxide** (Rutile — RCR_2)	67+ST
Tartaric acid (Crystal)	94.00
Trisodium phosphate	4.80
Thiourea	64+ST
Urea (Tech.)	2.60
Vacuum salt	1.00
Zinc Dust	30.00
Zinc Oxide	28.00
Zinc chloride powder (technical)	14.00
Zinc sulphate	4.20

SOLVENTS	**Per kg.**
Acetic Acid (Glacial)	13.00
Acetic Anhydride	26.00
Acetone	20.50
Adipic Acid	50.00
Aceto Acetanilide	50.00
Aniline Oil	45.00
Benzoate Plasticiser	33.00
Butyl Acetate	42.00
Butyl stearate	36.00
Butyl Acrylate	62.00
Butanol	39.00
Benzyl chloride	24.00
Benzo trichloride	16.00
Benzoyl chloride	22.00
Benzyl Alcohol (FPC)	36.00
Bromine Liquid	45.00
Chloroform	24 50
Carbon Tetrachloride	10.75
Cyclohexanone	36.50
Cyclohexanol	44.00
Diacetone	30+ST
Diethylene glycol (DEG)	31.00
Dioctyl Phthalate	48.50
Diallyl Phthalate	48.00
Dimethyl Phthalate	28.60
Dioctyl Adipate	52.00
Dibutyl Adipate	42.0
Dipentene	14.00
Dimethylamine 40%	12.00
Dimethylamine 60%	14.00
Ethyl Acetate	24.00
Ethyl Acrylate	46.00
Ethylene Dichloride	14.00
Ethylene Glycol	22.00
Formic Acid (Imp.)	30+ST
Formaldehyde	5.75
Glycerine (CP)	50.00
Glycerine (IW)	49.00
Hydrogen peroxide 50%	26.00
Iso Propyl Alcohol	18.50
Iso Butyl Alcohol	28.00
Monoethanolamine	46.50
Morpholine (Indian)	65.00
Melamine	36.00
Methyl Ethyl Ketone	36.00
Methyl Isobutyl **Ketone**	34.00
Methyl Acrylate	42.00
Methylene Dichloride	21.50
Meta Cresol	45.00
Nitrobenzene	16.50
Nitric Acid (Con.) (RCP)	2.60
Ortho Cresol	32.00
Phenol	36.00
Propylene Glycol	31.00
Polyethylene Glycol (No. 200)	36.00
Polythylene Glycol (No. 400)	37.00
Polyethylene Glycol (No. 500)	42.00

GAMMA ACID
ACETIC ACID
PHOSPHORIC ACID (Tech. & IP)
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GELATINE
GLYCERINE
PARACETAMOL IP
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OXYPHENBUTAZONE IP

at Company's Competitive Prices
Please Contact :

RAMESH BROTHERS
8th Floor, Vijay Tower, Opp. Abad Doiry, Kankaria Road,
AHMEDABAD-380 022.
Phones : 54156/53977 Resi : 369083/366310 Gram : "ACETIC"
Bombay Office : 202, Raut Chambers, 2nd Floor, 340/42, Samuel Street,
Vadgadi, BOMBAY-400 003.
Phones : 339384/335152 Resi : 867887 Grams : "KOTIYARK"

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ZINC CHLORIDE (Powder & Solid)
ZINC OXIDE (Rubber Grade)
ZINC CARBONATE
POLYSOL ★ IRON POWDER

Please Contact :

D. R. S. Corporation
187, Sherif Devji Street, 1st Floor,
R. No. 8, BOMBAY-400 003.
Phones : 333854/333864

FOR YOUR REQUIREMENTS OF :

NAME	C. I. NUMBER
Acid Rhodamine B	Acid Red 52
Acid Green V	Acid Green 16
Acid Patent Blue AS	Acid Blue 7
Acid Patent Blue VS	Acid Blue 1
Acid Violet 4BS	Acid Violet 49
Acid Coomassi Blue FF	Acid Blue 15
Basic Victoria Blue B	Basic Blue 26
Basic Victoria Blue B BASE	Solvent Blue 4

Full Range of Direct, Reactive, Ramazole
Please Contact Manufacturers for Competitive Rates :

MAHENDRA INDUSTRIES
Manufacturers & Exporters of Dyes, Chemicals & Dye Intermediates
Office : 312, Yogeshwar, 135/137, Kazi Sayed Street, 3rd Floor, Bombay-3.
Phones : 338770/345315, Resi. : 252296
Factory : 5/1/4, G.I.D.C. Phase-I, Vatva, Ahmedabad, Gujarat (India)
Phones : Factory : 393560 Tesi.: 441771/448188

For Your Regular Requirements Of :

- TRICHLORO ETHYLENE (Original/Tech.)
- IPA (Original & Distilled)
- METHYLENE CHLORIDE 99%
- ORTHO XYLENE
- DI ETHYL AMINE (Original)
- OXALIC ACID 92% & 98%
- TARTARIC ACID (Original/Recovered)
- ACETONITRILE (Original)
- ACRYLONITRILE (Original)
- TRISODIUM PHOSPHATE
- PARAFORMALDEHYDE 91%
- PROPYLENE GLYCOL (Dow)
- ACETONE (Original/Distilled)
- D. E. G. (Original/Repack)
- M. E. G. (Original/Repack)
- OXALIC ACID (Substitute)
- SORBITOL
- METHANOL (Distilled)
- SODIUM NITRATE
- GLYOXAL — 40%
- MALEIC ANHYDRIDE
- TRI ETHYL AMINE
- OCTANOL

Please Contact :

BEEKAY ENTERPRISES
M-1, Faiz-E-Qutbi, 375, Narsinatha Street, Bombay-400 009.
Phone : 349080/345011 Resi : 512 1572/512 4452

Polyethylene Glycol (No. 1600)	44.00
Polyethylene Glycol (No. 4000)	38.00
Polyethylene Glycol (No. 6000)	50.00
Para Cresol	60.00
Styrene Monomer	36.00
Sorbitol	16.00
Trichloroethylene	24.50
Triethanolamine	41.00
Sulphuric Acid	2.10
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
Triethylamine	50.00
Vinyl Acetate Monomer	38.50

SOLVENTS	**Per Litre**
Benzene	8.90
N-Heptane	8.00
N-Hexane	8.75
Methanol	6.75
Solvent Naphtha Heavy	9.50
Solvent Naphtha Light	8.50
Toluene	10.30
Xylene	12.00

DYES INTERMEDIATES PRICES ARE WITHOUT TAX & EXCISE	**Per Kg.**
Alphanaphthylamine	54.00
Aceto Acetic Ester (Methyl)	58.00
Alpha Naphthol (Imp.)	155.00
Ammonium Molybdate	170.00
Anthraquinone	80.00
Anthranilic Acid	63.00
2-Amino-4-Nitrophenol (Imp.)	140.00
Blue B. Base (Local)	235.00
Beta Naphthol (Atul)	58.00
Benzidine Dihydrochloride (BDH)	68.00
Bromamine Acid	400.00
BON Acid	110.00
Chicago Acid	275.00
C. Acid (Imp.)	260.00
Coach Acid	58.00
Cyanuric Chloride (Japan)	125.00
2, 4, DNCB	26.00
Dihydrothio PTOS (Imp.)	500.00
Dimethyl Aniline	53.00
Diethyl Aniline	135.00
Di-amino stilbene disulphonic Acid	115.00
3, 3-DCB (Imp.)	155.00
Gamma Acid (Atul)	160.00
H. Acid (Atul)	150.00
G. Salt	56.00
Isophthalic Acid	39.00
J. Acid	265.00
J. Acid Urea	265.00
K. Acid	95.00
MDPS (German)	210.00
MNA	75.00
Meta Unido Aniline	133.00
MPD (Local)	122.00
MPD (German)	140.00
Naphthenic Acid	11.00
N-Methyl J. Acid	390.0
N-Methyl Aniline	160.0
Napthalene crude	13.
Naphthalene (Refined)	20.0
Ortho Anisidine (OA Imp.)	85.0
Ortho Dichloro Benzene (ODCB)	10.0
OT Base	93.0
Para Dichloro Benzene (PDCB)	15.0
Para Anisidine (PA-Imp.)	110.0
Para Anisidine (PA-Local)	87.0
PNA	66.00
Para Cresidine (Imp.)	325.00
Para Amino Azo Benzene (India)	125.00
PNCB	26.00
Para Amino Acetanilide	140.00
1-Phenyl 3-methyl-5 Pyrazolone	110.00
Phenyl J. Acid	300.00
Para Amino Benzoic Acid	170.00
PT Base	88.00
Rhoduline Acid	425.00
Resorcinol	140.00
Resist Salt	18.00
Sodium-Naphthionate	62.00
5-Sulpho-Anthranilic Acid	60.00
Sulpho Tobias Acid	95.00
Sulphanilic Acid	24.50
Trichloro Benzene (TCB)	15.00
Tobias Acid (Imp.)	110.00

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ART-AO-8/79

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Sodium Lauryl Sulphate 30% Soln.
Benzyl Benzoate I.P.
Propyl Paraben

Contact the Manufacturers :

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4. Chheda Bhavan, 2nd Floor, 98, Surat Street.
Masjid, Bombay-400 009.
Phones : 341126/348022/330316

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MANNITOL
SORBITOL
CYCLOHEXANONE
ISO PROPYL ALCOHOL

PLEASE CONTACT :

RAM SHREE CHEMICALS

330, Samuel Street, 4th Floor, Room No. 402, Vadgadi, Bombay-400 003.
TELEPHONE : 32 99 76

Bombay Dyes Markets

(Prices as on 15th October, 1987)

ACID COLOUR	Per Kg
Acid Violet 4BS	143.00
Acid Maroon V	110.00
Acid Orange II	77.80
Acid Orange IIY	63.05
Acid Red A	107.25
Crosein Scarlet MOG	155.00
Acid Scarlet 3R	99.90
Acid Red 38N	135.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Green V	330.00
Acid Patent Blue AS	250.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	66.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	121.95
Acid Black BX	98.40
Acid Black Wax	135.50
Procinil Yellow GS (I.C.I., UK)	265.00
Procinil Red GS (I.C.I., UK)	530.00
Procinil Blue RS (I.C.I., UK)	315.00
Procinil Scarlet G (I.C.I., UK)	600.00
Procinil Orange G (I.C.I., UK)	250.00
Procinil Rubine (I.C.I., UK)	550.00

DIRECT COLOURS	Per Kg
Yellow 3GX	88.10
Sun Yellow RCH	124.40
Fast Yellow GCH	141.15
Yellow CFG Hly. Conc.	312.00
Fast Yellow GS	111.65
Fast Yellow CHRS	95.45
Viscose Orange A	166.15
Fast Orange GR	133.75
Red	96.90
Dark Tan	78.25
Red IIR	72.55
Red 4B	169.10
Bordeaux BW	132.30
Fast Scarlet 4BS	166.55
Red 12B	170.55
Bordeux Hly Conc.	194.00
Cotton Red N	117.05
Brill. Fast Helio B	278.00
Brill. Fast Helio 2B	297.00
Brill. Fast Helio 2RS	136.20
Brill. Fast Helio BS	116.10
Brill. Violet Extra	126.40
Blue 2B	86.60
Blue G	170.50
Sky Blue FB	188.25
Copper Blue GR	147.00
Fast Greenish Blue GL	114.60
Developed Black BT	116.10
Blue NB-2B	300.20
Blue NB-2BC	185.30
Developed Black NB-BH5	185.30
Green B	111.65
Green NB-B	188.25
Green 2B-N	188.25
Brown MR	154.40
Brown CN	107.25
Golden Brown G	140.35
Catechin G	120.50
Omega Tan	126.40
Catechin GS	102.80
Black E Hly Conc.	142.60
Black E Extra Hly Conc.	142.60
Black NB-ER Hly. Conc.	310.50

DISPERSOL COLOURS	Per Kg
Yellow 6G Powder	143.80
Red B 3B Powder	247.80
Red B 2B Powder	323.20
Red CB Powder	439.15
Red D2B Powder	477.40
Violet C 4R	521.90
Blue BG Powder	235.45
Blue BN Powder	103.75
Blue D 2R Powder	476.25
Navy BT Powder	243.90
Blue B 2G Powder	210.20
Black BT Powder	182.60
Blue BR Powder	390.20
Yellow 7GL	338.60
Yellow 5RX	218.80
Yellow 3G	367.25
Yellow	140.00
Yellow AL	135.30
Yellow Brown REL	247.50
Yellow FFL	463.60
Gold Yellow GG	259.70
Pink REL	247.00
Red REL	468.65
Red 2B	327.40
Red FB	324.20
Red Violet FBL	469.85
Orange 3R	196.65
Violet 3R	280.60
Violet 6R	485.75
Violet RL	275.45
Scarlet RR	214.85
Rubine 3B	223.05
Rubine CB	364.90
Blue GL	318.95
Blue BGF	636.55
Navy Blue RE	270.40
Brown 3REL	200.40
Black GEL	324.20
Dark Brown 3B	317.40

BASE COLOURS	Per Kg
Fast Yellow GC	80.20
Fast Orange GC	135.45
Fast Scarlet R	166.80
Fast Scarlet RC	126.65
Fast Scarlet RCR	99.05
Fast Scarlet G	121.65
Fast Scarlet GN	91.50
Fast Scarlet GG	72.70
Fast Scarlet GGS	72.70
Fast Red B	203.20
Fast Red RC	119.15
Fast Red R Flakes	149.25
Fast Red TR	166.80
Fast Red TR Oil	183.15
Fast Red RL	237.10
Fast Red KB Oil	201.95
Fast Bordeaux GP	201.95
Fast Garnet GBC	94.05
Fast Violet B	505.60
Fast Blue BB	521.45

NAPHTHOL COLOURS	Per Kg
ASG	217.00
AS	143.00
ASSW	279.75
ABBS	188.15
ASBO	195.65
ASD	175.60
ASOL	179.35
ASTR	279.75
ASPH	279.75
ASE	196.05
ASEI	184.40
ASLB	1632.60
ASBT	1817.00
ASWG	143.00
ASSG	397.70
ASSR	480.50

OCION COLOURS	Per Kg
olden Yellow HR	181.80
ill. Yellow H 4G	117.55
pra Yellow H-8GP	168.55
ill. Yellow HE6G	166.95
llow H-E4R	276.05
ill. Yellow H7G	332.30
llow M4R	243.95
llow M GR	326.05
ill. Yellow M 4G	177.10
ill. Yellow M 8G	332.30
llow M 3R	217.60
ill. Orange H 2R	241.85
ill. Orange M 2R	313.15
ill. Red H 7B	157.95
ill. Red H 8B	169.45
ill. Scarlet H RN	245.05
upra Red H-3BP	179.30
rill. Red H-F3B	243.45
rill. Magenta HB	167.00
rill. Red M 5B	98.90
rill. Red M 8B	173.70
rill. Pink MB	137.10
rill. Magenta MB	121.55
rill. Purple H-3R	180.20
rill. Purple H-7R	175.40
avy Blue H 3R	298.50
rill. Blue H-GR	366.55
rill. Blue H 5G	173.10
lue H 5R	283.85
rill. Blue H 7G	178.70
rill. Blue H 7RX	358.15
urquoise HA	234.45
upra Blue H-3RP	335.70
upra Turquoise H 2GP	181.50
lue H-ERD	305.80
avy Blue H ER	258.60
lue H 5RX	269.30
avy Blue M 3R	310.95
rill. Blue MR	331.70
rill. Blue M RX	214.20
rill. Blue M-G	382.30
lue M 4GD	344.60
avy Blue M RB	318.75
urquoise M-G	197.85
Brill. Blue M GX	302:50
Blue 3R Acra Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg)	285.00
Green H 4BD	269.80
Green H-E4BI	169.80
Red Brown H 1F	143.25
Orange Brown H 2B	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS	Per Kg
Navy Blue	99 85
Green G	198.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI)	Per Kg
Yellow 5G Powder Fine	673.15
Yellow 5G Supra Disperse	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr Fine	624.35
Gold Orange 3G Supra Disp.	570.30
Brill. Orange 6R Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disc.	713.20
Brill. Purple 4R Conc Powder	470.75
Brill. Purple 3R Acra Powder	696.85
Brill. Purple 2R Hly Conc.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Conc.	625.95
Blue R Powder Fine	542.15
Blue BC Conc Pdr. Fine	522.50
Blue BC Acra Conc Pdr. Fine	762.70
Blue R Conc Pdr. Fine	577.65
Blue RR Supra Powder	629.35
Blue Conc Powder	645.80
Brill. Blue 2R Hly Conc	378.55
Brill Blue 2R Supra Disp.	115.65
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Pdr.	823.95
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Pdr. Fine	419.65
Jade Green 2G Ptg. Paste	125.40
Olive Green B Pdr. Fine	399.90
Olive Green B Supra Disp.	3[illegible]8.26
Jade Green 2G Supra Disp.	496.00
Jade Green XBN Supra Disp. (N)	327.30
Olive D Pdr. Fine	444.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp.	536.05
Olive R Pdr. Fine	422.95
Olive R Supra Disp.	363.90
Olive D Supra Disp.	361.70
Olive D Ptg. Paste	193.00
Olive Green B Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc	640.00
Olive Green B Acra Conc	542.75
Brown R Pdr. Fine	835.00
Brown G Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
Dark Brown 3R Pdr. Fine	685.00
Brown G Supra Disp.	449.90
Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.55
Brown G Acra Conc	733.95
Brown R Acra Conc	765.00
Grey M Powder Fine	763.80
Grey M Supra Disp.	585.45
Blue BC Acra Conc Pdr. Fine	762.70
Direct Black AC Pdr. Fine	474.70
Direct Black AC Supra Disp.	330.35
Direct Black CH Supra Disp.	393.20
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI: OCT. 16 (NNS) — Mercury went up by Rs. 150 per flask in the local chemicals market during past week, on acute shortage of stocks as well as bullish advices from Bombay, says NNS. Tartaric acid also gained Rs. 200, while Ammonia bicarb and menthol reacted downward owing to persistent inflow.

Mercury flared up sharply by Rs. 150 at Rs. 6850 per flask due to inadequate stock position coupled with higher Bombay advices where its prices spurted from Rs. 6500 to Rs. 6800 per flask.

Tartaric acid rose smartly by Rs. 200 at Rs. 6400 per 50 kg. in the absence of imports from France and Spain. Sodium nitrite hardened by Rs. 30 at Rs. 680 owing to reacted supply by distributors. In Bombay it was quoted at Rs. 640. Sodium nitrate however, suffered a fall of Rs. 10 in face of slack offtake.

Sodium hydro sulphite Domcsha Kalali improved by 50 paise each at 32.50 and Rs. 35 per kg. respectively thanks to better demand shown by gur khandsari makers of U.P. and Haryana. Rangolite was not available in sufficient quantities. In Bombay rangolite recorded a handsome gain of Rs. 5 at Rs. 68 per kg. Caustic soda solid and flakes advanced by Rs. 2/5 at Rs. 245 and Rs. 365 per 50 kg. caused by tight supply. Soda ash and Soda bicarb also ruled static due to scare supply.

Ammonia bicarb, on the other hand, dropped by Rs. 10 caused by comfortable supply as well as slack offtake. Within a month its prices suffered a steep fall of Rs. 32. On reports of about 7/8 tonnes of the commodity commenced from Rampur, Moradabad, Chandosi and Sambhalpur mandis U.P. induced by slack demand shown by consumers, menthol flake, medium and bold slipped by Rs. 5/10, at Rs. 140, Rs. 152 and Rs. 160 per kg. respectively. Menthol oil also ruled quiet at Rs. 106 per kg.

Titanium dioxide Anatase suffered a setback of Rs. 2 at Rs. 50.50 and RC-822 softened by 50 paise at Rs. 57 per kg. respectively owing to nervous selling by distributors and stockists in face of increased offerings. Formic acid decreased by Re. 1 at Rs. 31/32 per kg. Borax crystal declined by Rs. 10 in the absence of enquiries.

Dyes and colours remained unchanged at their last week level.

DELHI MARKET RATES AS ON OCTOBER 16, 1987

Ammonia Bicarb (per 25 kg.)	130.00
Mercury (per flask)	6,850.00
Soda ash (per bag)	270-285.00
Ammonium Chloride (per 50 kg.)	110-180.00
Caustic Soda solid (per 50 kg.)	365.00
Caustic soda flakes (per 50 kg.)	345.00
Citric acid (per 50 kg.)	2050-2150.00
Stable Bleaching Powder Shriram (per 25 kg.)	89.00
Stable Bleaching Powder KCI (per 25 kg.)	83.00
Stable Bleaching Powder MODI (per 25 kg.)	87.00
Sod. Bicarbonate (per 50 kg.)	250.00
Sod. Hydro Sulphite (per kg.)	31-35.00
Rangolite (per kg.)	37.50-38.50
Boric acid Technical (per 50 kg.)	980.00
Paraffin wax (per 50 kg.)	625.00
Tartaric acid (per 50 kg.)	6,400.00
Borax Granular (per 50 kg.)	520.00
Borax Crystal (per 50 kg.)	540.00
Sodium Nitrite (per 50 kg.	680.00
Sodium Nitrate (per 50 kg.)	400.00
Camphor Thal (per kg.)	100.00
Camphor Powder (per kg.)	90.00
Menthol Bold (per kg.)	160.00
Menthol flake (per kg.)	140.00
Menthol medium (per kg.)	152.00
Glycerine (per kg.)	45-55.00
Sodium Silicate (per quintal)	300.00
Hexamine (per kg.)	26.00
Acetic Acid Glacial (per kg.)	14.50-18.00
Copper Sulphate (per quintal)	1,500-1,800.00
Formic acid (per kg.)	31-32.00
Formaldehyde (per kg.)	6.00
Hydrogen Peroxide (per kg.)	30.00
Calcium Carbonate (per Tonne)	2,500-4,000.00
Acid Slurry Soft (per kg.)	25.00
Acid Slurry Hard (per kg.)	32.00
Phosphoric Acid (per 50 kg.)	810.00
Pot. Nitrate (per quintal)	850-1,200.00
Pot. Permangnate (per 50 kg.)	2,400.00
Sod. Bichromate (per 50 kg.)	1,025-1,125.00
Tri-sod. Phosphate (per 50 kg.)	310-330.00
Titanium Dioxide Anatase (per kg.)	50.50
Titanium RC-822 (per kg.)	57.00
Zinc Oxide (Per Metric Tonne)	28,500-32,500.00
Phenol Carbolic Acid (per kg.)	28.00
Carbon Tetrachloride (per kg.)	16.50
Chloroform (per kg.)	26.00
Sodium Sulphate (per m. tonne)	3,000-3,200.00
Naphthalene Balls (per 50 kg.)	1,025-1,050.00

DYES & COLOUR	Per Kg.
Naphthol AS	150.00
Naphthol ASG	235.00
Naphthol ASBS	200.00
Naphthol ASTR	302.00
Naphthol ASOL	191.00
Naphthol ASBO	208.00

DIRECT DYES	Per Kg.
Black E. Conc.	92-150.00
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Green B.	115.00
Blue 2-B	86.00
Sky Blue FB	200.00
Basic Auramine 'O' Conc.	55-100.00
Basic Rhodamine B. 500%	220-300.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
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- A special section on Machinery & Equipments for the industry is also being planned.

For details Please contact the publishers :

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AMINO ETHYL ETHANOLAMINE : From Sweden : Sandoz (I) Ltd., 5,000 kgs., Rs. 1,46,615.

ANTIMONY TRIOXIDE : From West Germany : J K. Synthetics Ltd., 2,500 kgs., Rs. 3,20,393.

✓AROMATIC CHEMICALS : From Holland : Naarden India Ltd., 36 kgs., Rs. 1,21,115.

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BUTYL GLYCOL : From West Germany : Nerolac Paints Ltd., 15,200 kgs., Rs. 1,61,131.

CAPROLACTAM : From Belgium : J.K. Synthetics Ltd., 4,97,000 kgs., Rs. 92,91,879.

CHEMICALS : From UK : Western Trading Corpn., 188 kgs., kgs., Rs. 1,22,037.

CHLORO PHENOL : From Japan : Sunbeam Monochem P. Ltd., 3,500 kgs., Rs. 88,562.

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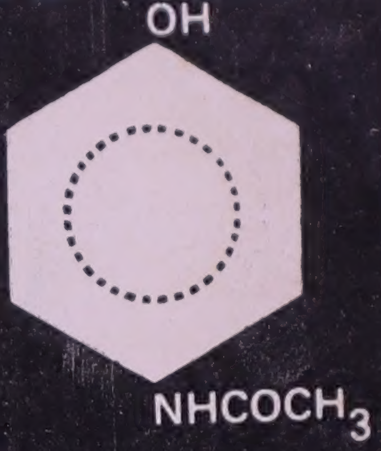

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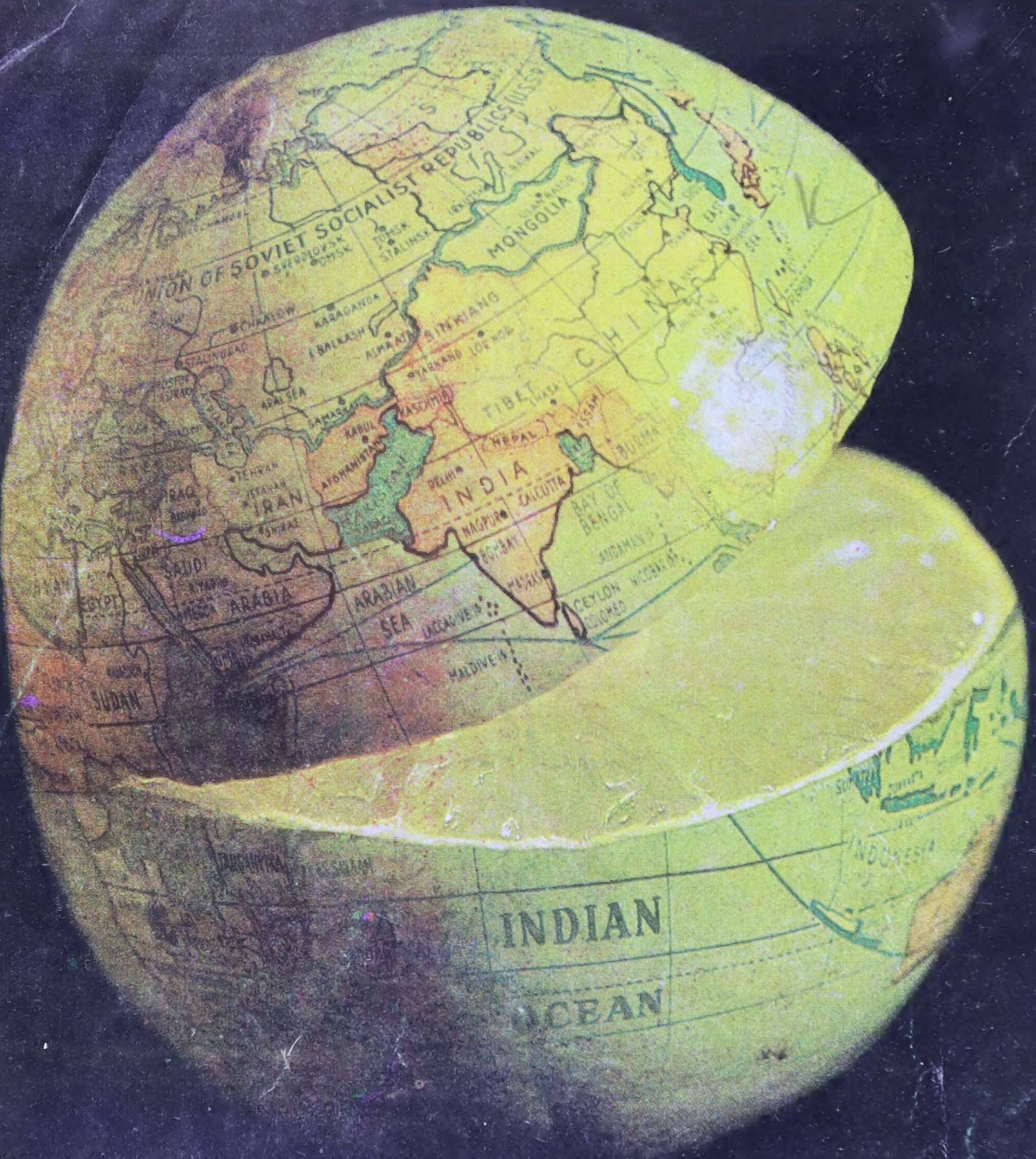

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